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CONTENTS

Dear Colleagues,

We hope that the 7th International Congress of the Romanian Society of Oral Rehabilitation and the First Congress of the Society of General and Oral Rehabilitation: "Challenges of General and Oral Rehabilitation" will constitute a viable starting point for the establishment of the bridges between general and oral rehabilitation with profound implications in the integrative holistic approach of the patient.

The Romanian Society of Oral Rehabilitation and the Romanian Society of General and Oral Rehabilitation, the main organizers of this scientific event, in collaboration with the International Society of Oral Rehabilitation, under the aegis of the Romanian Academy, the Academy of Medical Sciences, aim at facilitating lucrative meetings with the international companies in the field, materializing the binomial General and Oral Rehabilitation.

It is a prestigious manifestation, marked by the challenges of general and dental medicine, authentically promoting the medical concept of contemporary dental medicine.

Intercontinental Hotel offers both a pleasant and elegant environment for the elite of national and international medicine and an optimum space for the conference's hands-on.

The common themes in the field of cardiology and diabetes and other metabolic diseases, dermatology, infectious diseases, pediatrics constitute approaches of major interest for general medicine and contemporary dental medicine alike.

The varied scientific program will reunite conferences focused on reference themes in the field of general and oral medicine as well as workshops dedicated to the new laser techniques and technologies, with profound implications on the therapeutic success.

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ON-LINE EVALUATION OF TYPES OF CROWNS USED IN CLINICAL PRACTICE OF DENTAL STUDENTS AT AN INTERNATIONAL LEVEL

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ABSTRACT

Continuous development of technology in dental medicine and the high esthetic demands of the patients determined a significant increase of using non-metallic crowns in clinical practice of dental students. Zirconium, pressed ceramics or CAD-CAM technologies seems to become part of the daily routine in the dental faculties creating a tendency of replacing the classical solutions. **Matherial and Method**. We used an on-line survey with questions regarding the frequency of using different types of crowns by dental students and also regarding the use of different impression materials and cementation protocols. The questionnaire was set using an electronic platform and a special data base able to register the answers. The survey was sent to dental students from 42 different countries using the logistics of the International Association of Dental Students (IADS). **Results**. The results shown that the frequency of using different types of crowns in clinical practice was different and connected to the therapeutic concepts of the dental school they study in, to the country they live in and to the social and economical status of the geographical area. **Conclusions**. The full ceramic crowns and zirconium based crowns had a high frequency of using especially in the anterior area. The use of the noble alloys as metallic frame was not that popular. The study also put into evidence the inappropriate use of the luting materials for the full ceramic and zirconium based crowns in some cases..

Key words: dental crown, dental student

INTRODUCTION

The clinical longevity of teeth restored with inlays, onlays, crowns, and partial veneer restorations was very good during the years. However, continuous development of the avant-garde technologies in dental medicine and the higher esthetical demands of the patients determined a significant increase of the frequency of using crowns without metallic frame in clinical practice of the dentists. Computer-aided design and computer-aided manufacturing restorations, laboratory-constructed all-ceramic bonded restorations and zirconium based crowns are more often viewed as the treatment of choice (1).

All these modern technologies are starting to become part of the daily routine not only in the private practices, but in the dental schools as well, creating a tendency of replacing the

classical prosthetic solutions (metallic inlays, onlays, crowns and ceramo-metal crowns).

So, it is very important for dental students to know that the patient variables and expectations may influence patients' evaluations of treatment outcomes, which are essential to the success of therapy. There are studies on their expectations before and satisfaction after prosthetic therapy with regard to mastication, aesthetics, comfort, and phonetics. Often the patient expectations before treatment were higher than satisfaction after treatment because they had unrealistic expectations (2).

The attitude towards oral health and the choice of dental restorations can be influenced by gender, the level of education and the social background of the patients. Some studies have demonstrated that female patients have statistically significant higher percentage of restoration, more teeth with crowns and more composite fillings compared to men. Patients with a higher level of education preferred more expensive restorations, whereas patients with a low level of education exhibited more inexpensive restorations (3).

The choice between several treatment options for covering a single tooth is influenced by clinical, dentist and patient-immanent factors. The majority of patients report that the main reason for covering a tooth is for esthetical and function. An important factor affecting the choice between treatment modalities was damaging the teeth structures. Pain, post operative sensitivity and dental phobia were another important factors in choosing the prosthesis type. The final choice between several treatment options depended on some factors which affected the decision making; among these is cost and patients' awareness of the different treatment options (4).

Patients treated with dental crowns need a recall attendance and this should be taken into consideration during patient consultation and prosthetic planning (5).

Finally, but not at least, doctor personal skills, specialty training and experience, may become more significant in planning treatment and decision making in modern restorative treatment planning (6).

MATERIAL AND METHODS

Our research involved an on-line survey with questions regarding the frequency of using different types of crowns in the anterior and lateral area and also regarding the use of different impression and lutting materials.

A poll was created using an online surveys website. The website offers the facilities of hosting data bases and registering multiple answers for certain questions. In the same time the answers are stocked according to the way they were chosen by the respondent and the results are accessible only to the administrator of the poll. This fact offers the advantage of not influencing the accuracy of the answers.

The questionnaire was set using an electronic platform and a special data base able to register the answers. The survey was sent to dental students from 42 different countries using the logistics of the International Association of Dental Students (IADS). The International Association of Dental Students is the worldwide representative organization in this field and has precise contacts of dental schools and students from all member countries. The criteria of selection for the respondents were to be an undergraduate dental student from an accredited institution of dental education and the e-mail address provided by IADS to be active.

We have received 124 valid answers from 24 countries: Czech Republic, India, Germany, Portugal, Spain, Sudan, Egypt, Kazakhstan, Romania, Hungary, USA, Croatia, Pakistan, Slovenia, Finland,

Netherlands, Denmark, Tunis, Bulgaria, Armenia, Georgia, Ghana, Indonesia and Iran.

The questionnaire was composed by four questions and every question some different possible answers (fig.1). The questions were:

1. What type of crowns do you use in the anterior area?

2. What type of crowns do you use in the lateral area?

3. What type of impression material do you use?

4. What kind of material do you use for bonding/luting the full ceramic or zirconium based crowns?

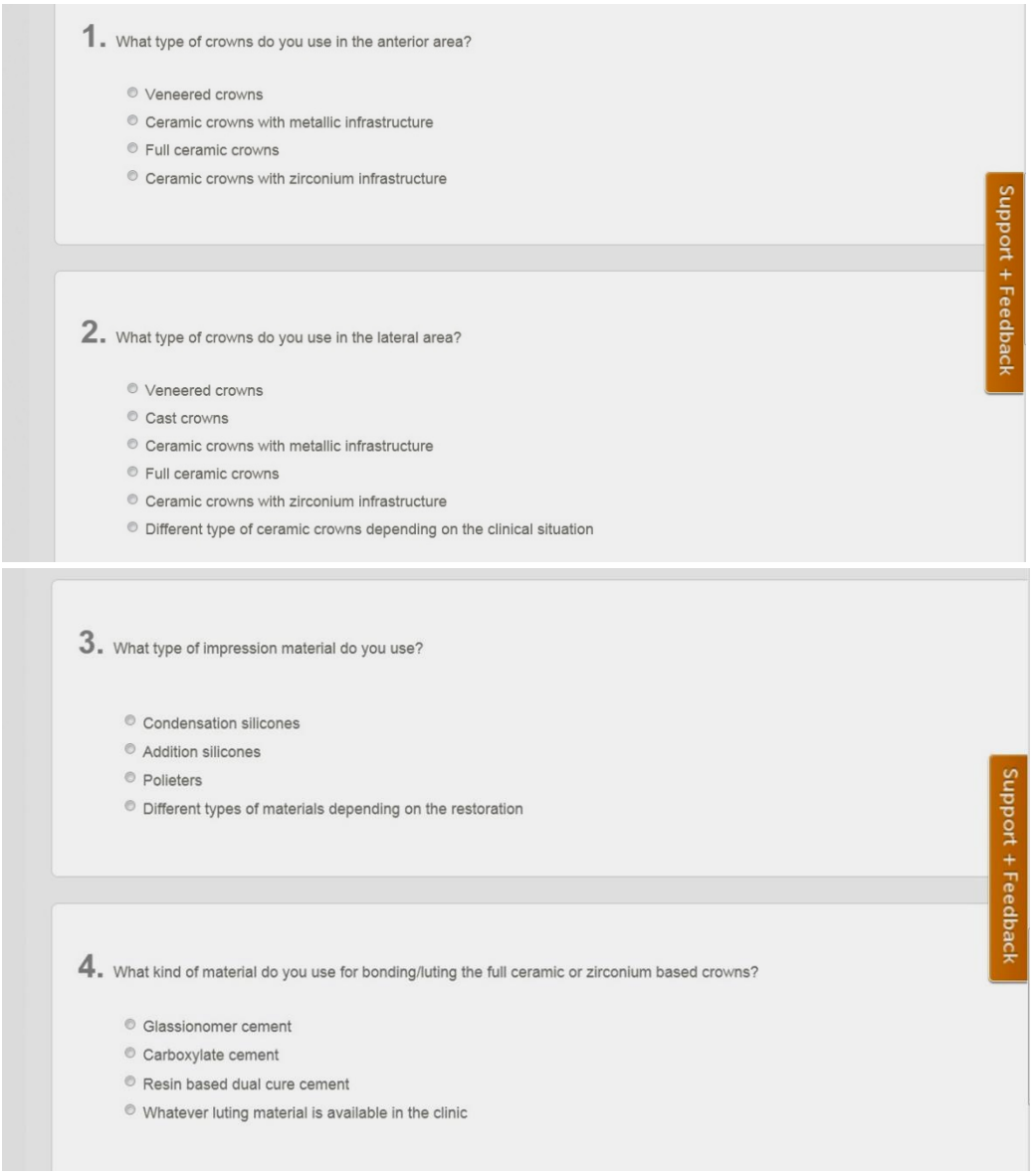


Figure 1. The questions and their possible answers

RESULTS:

The answers recorded are presented below and illustrated in figures 2-5:

Q1. What type of crowns do you use in the anterior area?

- Veneered crowns (32 answers)
- Ceramic crowns with metallic

infrastructure (40 answers)
- Full ceramic crowns (46 answers)
- Ceramic crowns with zirconium infrastructure (6 answers).

Q2. What type of crowns do you use in the lateral area?

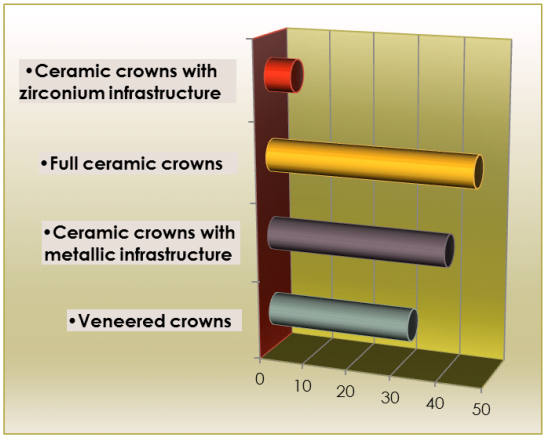
- Veneered crowns (24 answers)
- Cast crowns (16 answers)
- Ceramic crowns with metallic infrastructure (47 answers)
- Full ceramic crowns (4 answers)
- Ceramic crowns with zirconium infrastructure (11 answers)
- Different type of ceramic crowns depending on the clinical situation (22 answers)

Q3. What type of impression material do you use?

- Condensation silicones (52 answers)
- Addition silicones (27 answers)
- Polieters (11 answers)
- Different types of materials depending on the restoration (34 answers)

Q4. What kind of material do you use for bonding/luting the full ceramic or zirconium based crowns?

- Glassionomer cement (13 answers)
- Carboxylate cement (5 answers)
- Resin based dual cure cement (72 answers)
- Whatever luting material is available in the clinic (34 answers)



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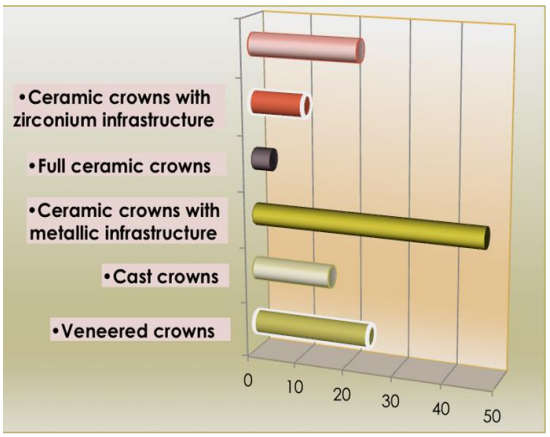

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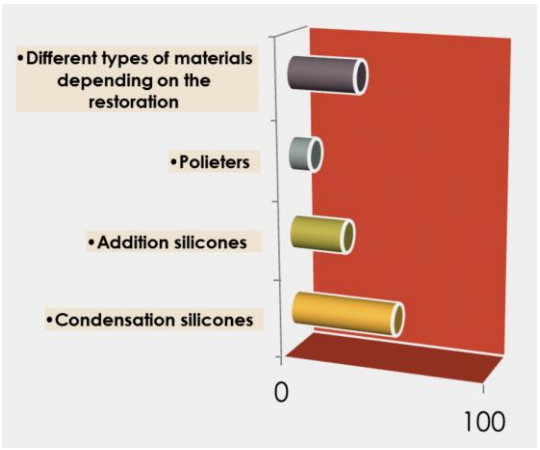

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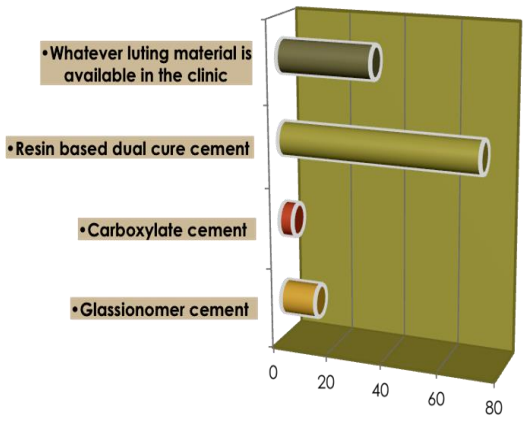

Figure 5.

DISCUSSIONS

The results shown that the classic prosthetic option represented by ceramo-metal crowns is commonly used in both area, anterior and posterior, but the modern therapeutic solutions as all ceramic and zirconia based crowns are used too, but in a smaller percent. The use of the cast crowns was not that popular, not even in the lateral area. Frequency of using different types of crowns in clinical practice of dental students it is normally different and close connected to the therapeutic concepts of the dental school they study in, to the country they live in and to the social and economical status of the geographical area.

The results also shown what dental cementation protocols are currently being taught and used for crown restorations in dental schools. There are a wide range of cementation protocols and materials used; however, some common trends were identified among dental schools programs (7). The most commonly used technique prior to definitive cementation is to airborne-particle abrade the intaglio surface of the restoration. Resin-based dual cure cements is the recommended and most frequently used luting agent for bonding full ceramic/zirconium crowns. Regarding this aspect, a big number of wrong answers (34 – "whatever luting material is available in the clinic") put into evidence an inappropriate use of the luting materials for the full ceramic and zirconium based crowns in some cases.

CONCLUSIONS

Even the ceramo-metal crowns are still the most common therapeutic choices, the full ceramic crowns and zirconium based crowns had an increased tendency of using especially in the anterior area. This fact is justified through the natural-like properties of the crowns and the high esthetics in the cervical area but is limited by the higher price of these modern prosthetic solutions.

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EVALUATION OF RISK FACTORS IN PATIENTS WITH FACIAL PARALYSIS IN DENTAL PRACTICE

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ABSTRACT

Facial palsy and paralysis causes facial asymmetry, with negative effects on the functions of the stomatognathic system and on the quality of life of the affected patients. These patients have multiple risks in the dental office because of the extremely diverse etiological factors that can be found in facial paralysis. This paper addresses clinical aspects of central and peripheral facial paralysis, with examples of clinical cases and differential diagnosis of these disorders. The risks that the dentist should evaluate in the patient with facial paralysis and the way in which these can interfere with dental treatment are also considered.

Key words: facial paralysis, facial palsy, facial asymmetry, risk factors, dental practice

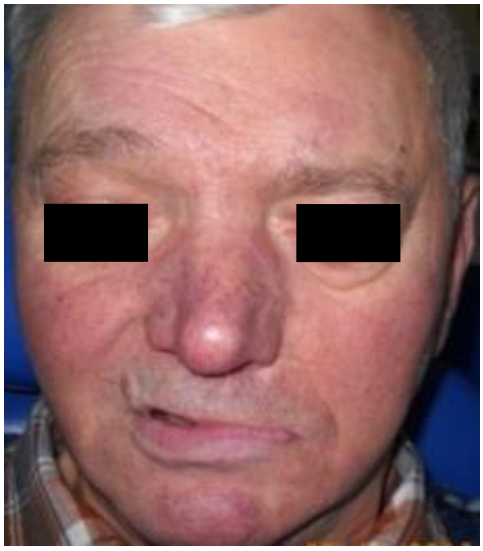
INTRODUCTION

Facial asymmetry can be found in many disorders that may affect bone support, dento-periodontal structures, soft tissue, blood vessels (hemangiomas), as well as nerve structures. The facial nerve innervates the platysma muscles of the face and neck, being responsible for facial motility and mimicry. Through the innervation of the buccinator muscle, the facial nerve also plays a role in mastication, by driving the food fragments between the dental arches. Through the coordination of labial muscles, it plays a role in the correct pronunciation of phonemes ”m, b, p”. Although it is a mixed nerve with a predominantly motor function, through sensory fibers it gathers information from the anterior 2/3 of the tongue and through sensitive fibers it provides exteroceptive sensitivity in the retroauricular, conchal region, in the external auditory canal. The facial nerve also has a secretory motor function, ensuring the innervation of lacrimal,

submandibular, sublingual, pharyngeal, palatal and nasal glands[1]. The real origin of the cranial nerve VII is in the pons, and its apparent origin is in the bulbopontine sulcus. The upper part of the facial nerve nucleus receives afferents from the ascending contralateral frontal cortex, but also from the homolateral hemisphere[2]. The sensitive-sensory afferents are projected in the cortical areas 1, 2, 3 and in the gustative area 43 from the ascending parietal gyrus. After leaving the cerebral trunk, the facial nerve enters the middle cerebral fossa, the inner ear, then it runs through the three segments of the fallopian canal: labyrinthine, tympanic and mastoid. Given that the course of nerve VII through the fallopian canal has two bends and the canal is narrow, the development of ischemic lesions in facial nerve inflammation is favored. Nerve VII leaves the skull through the stylo-mastoid foramen, enters the parotid gland, after which it divides into terminal motor branches. The facial nerve most frequently ramifies into two peripheral branches: the upper temporofacial branch, and the lower cervicofacial branch. Sensory fibers originate in Gasser's ganglion are located in the fallopian canal[3].

Clinical manifestations in facial paralysis

The clinical aspects found in facial paralysis are different depending on the level of the lesion. In suprapontine lesions, i.e. central type lesions, the lower face is affected, because the upper portion of the pontine nucleus receives double central afferents, both contralateral and homolateral. In contrast, the lower portion of the nucleus of nerve VII only receives contralateral afferents from the cortex. In pontine and infrapontine lesions, facial paralysis is of peripheral type and affects the entire hemiface. Depending on the level of the lesion, facial paralysis can be purely motor or associated with sensitive-sensory disorders. In central paralysis, there may be mild dysfunctions in the upper face [4].



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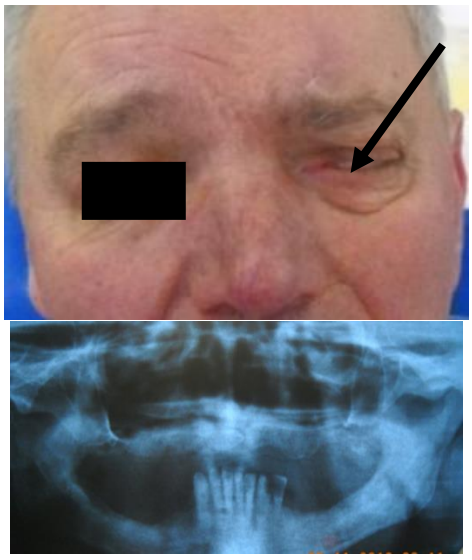


1b, 1c

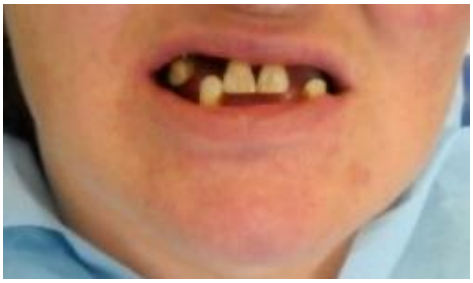
Figure 1. Left peripheral facial paralysis: absence of folds in the left hemiforehead (1a), deviation of the tip of the nasal pyramid and philtrum towards the healthy side (1a), ptosis of the left labial commissure (1a), left lagophthalmia (1b); in a 65-year-old patient, with tooth impaction 1.3, with total maxillary edentation and partial mandibular edentation, with multiple dental foci (1c)

Clinical manifestations in peripheral facial paralysis (PFP)

The static examination of the face shows: facial asymmetry, the paralyzed hemiface is fallen, disappearance of folds, wide open palpebral fissure, ectropion associated or not with epiphora, no eye blinking reflex, flattened nostril, ptosis of mouth corner (see Fig. 1).

Clinical manifestations in central facial paralysis (CFP)

On the static examination of the face, changes are usually moderate, only a mild ptosis of the labial commissure is seen. Changes become obvious during voluntary movements and less obvious during automatic activities. If patients are asked to smile or show their teeth, the labial commissure will be displaced towards the unaffected side. In the upper half of the face there are no changes in facial dynamics or, if changes are present, they are mild. Central facial paralysis (CFP) most frequently occurs in stroke. In this situation, stroke is accompanied by motor deficit in the affected hemibody (see fig. 2).



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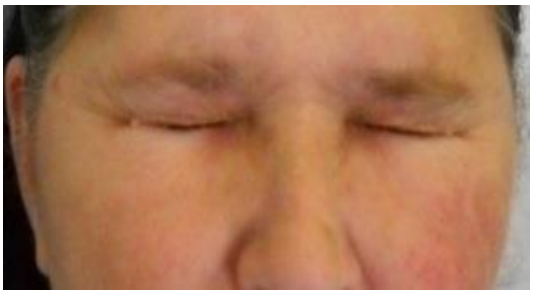
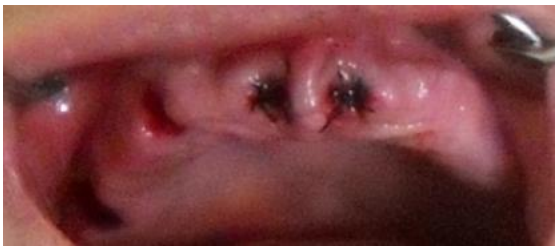


2b

2c



2d

Figure 2. Left central facial palsy: asymmetric smile with the labial commissure displaced towards the right side (2a), without changes in the upper half of the face (2b), in a patient with sequelae of stroke, with left hemiparesis (2c), focal epileptic seizures, arterial hypertension, severe periodontal disease, partial maxillary and mandibular edentation , in whom residual maxillary teeth were extracted and post-extraction alveoli were sutured (2d)

The patient that will request medical assistance will be a patient with sequelae after stroke. If the patient can walk without help or with a walking stick or a walking frame, the following will be noted: hemiplegic gait, with the lower limb in extension, in order to walk the patient must move the gravity center to the healthy leg, the upper limb is flexed, with a ”cortical thumb”, with an impossible or difficult two finger grip. During anamnesis,

patients can be found to have sensory aphasia (they do not understand what they are told them, can express themselves fluently but not correctly from a semantic point of view), motor aphasia (they understand what they are told them, but cannot express themselves verbally, only by writing with the unaffected hand), or mixed aphasia (they cannot understand what they are told them and cannot answer the questions). These language disorders occur in lesions of the left hemisphere, being accompanied by right CFP with right hemiparesis or hemiplegia. Ischemic stroke are less severe than hemorrhagic stroke, which are life threatening[3].

Differential diagnosis

The first question that the dentist should answer is whether facial asymmetry is due to a nervous dysfunction. Muscle dysfunction may be due to muscle disorders or changes in the neuromotor plate. Characteristic of these disorders is the symmetrical and bilateral involvement of facial muscles. Among neuromuscular diseases, myasthenia gravis should be differentiated from facial paralysis. In this disease, muscle strength decreases with muscle fatigue, which increases in the evening. Facial asymmetry due to the congenital absence of facial muscles such as the agenesis of the depressor anguli oris muscle in Cayler syndrome can be found[5]. Facial asymmetry is diagnosed during infancy because of the asymmetric crying facies and is limited to the affected labial commissure. There are also genetic diseases in which the agenesis, hypoplasia of the nucleus of nerve VII or the agenesis, hypoplasia of the facial nerve is present. These include Möbius syndrome, characterized by facial diplegia with bilateral peripheral paralysis, i.e. the patient cannot form facial expressions, associated with the paralysis of nerve VI. Forms of Möbius syndrome with unilateral PFP are also described.

If the answer to the question above is affirmative, PFP should be differentiated from CFP (see figures 1 and 2). If the patient has CFP, its cause should be evaluated. CFP most frequently occurs in the context of a stroke. The dentist should not be satisfied with the information that the patient has a history of stroke, but he should know the cause of the stroke and whether it was an ischemic or a hemorrhagic stroke (see Table 3).

Table 3. Differential diagnosis between ischemic and hemorrhagic stroke

	Ischemic stroke	**Hemorrhagic stroke**
Onset	Frequently slow, during rest	Sudden, in an apparently healthy subject
Cephalalgia	-	+
Consciousness disorders	Frequently absent	+
Blood Pressure	Normal or slightly increased	High, very high values
Cerebrospinal Fluid	Clear	Hemorrhagic
Personal history	Transient ischemic stroke +	Transient ischemic stroke -
Evolution	Favorable	Unfavorable

The causes of a stroke are rarely primarily located in cerebral vessels (congenital aneurysms), most frequently the cause is found at a distance[6]. The etiopathogeny of stroke mainly includes cardiovascular disorders, as shown in Table 4.

Table 4. Etiopathogeny of stroke

- High Blood Pressure, Arterial hypotension

- Cardiac diseases – rheumatic valvulopathies, mitral valve prolapse, cardiac arrhythmias, infectious endocarditis, heart attack, chronic heart failure, cardiomyopathies, cardiac surgery
- Cerebral atherosclerosis
- Obliterating thromboangiitis
- Horton temporal arteritis
- Arterial abnormalities
- Compression of cerebral arteries at cervical level
- Diabetes mellitus
- Infectious, parasitic and mycotic arteriopathies
- Vasculopathies in autoimmune disorders - (disseminated lupus erythematosus)
- Hematological disorders
- Endocrine disorders
- Contraceptives
- Smoking
- Psychic factors
- Cerebral ischemia in headache

Risk factors in patients with central facial paralysis in the dental office

In a patient with CFP with a history of stroke, the cause of stroke should be looked for. The first general disorder that should be considered is cardiovascular disease. The patient can be hypertensive, with a risk to develop a hypertensive episode or a new stroke in the dental office. High blood pressure most frequently determines hemorrhagic stroke, but ischemic stroke are not excluded, through the obliteration of blood vessels by atheromatous plaques and cerebral vascular thrombosis[6]. A sudden decrease of blood pressure in a hypertensive patient by more than 25% of blood pressure values may lead to the development of an ischemic stroke, the brain perceiving this decrease as cerebral hypoperfusion[7]. Arterial hypotension may predispose the patient to lipothymia, syncope and ischemic stroke. If a patient with a history of ischemic stroke is in the dental office, attention during anamnesis should be focused on potential sources of thromboemboli. The affected heart is the main source of thromboemboli that can reach the general circulation and infarct various organs including the brain. All cardiac diseases that induce local stasis favor the formation of thromboemboli. The most frequent cardiac disorders that favor thromboembolism are cardiac rhythm disorders that cause ineffective heart contractions[8]. Of these, chronic atrial fibrillation (AF) determines a thromboembolic risk of 3-8%[8]. In chronic AF, the atria contract at a rate of 400-600 beats/minute, and transmission to the ventricles can be at a high ventricular rate (VR) when tachycardic pulse is present at the periphery, at a normal or low VR. In the dental office, we can only suspect chronic AF if the patient does not have a diagnosis made by the cardiologist. In order to prevent the risk of a thromboembolic accident in a patient with chronic AF, the cardiologist will also prescribe anticoagulant therapy associated or not with platelet antiaggregant therapy[9]. The aim of the cardiologist is to maintain the patient's INR (International Normalized Ratio) values between 2.5-3.5. In contrast, the dentist, who must perform bleeding procedures in the oral cavity, aims to have the patient's INR values lower than 2-2.2. There should be a good collaboration between the two specialists, so as to avoid vital risks for the patient. In the case of a patient with chronic AF, the cardiologist may decide to suppress the oral anticoagulant or to replace oral anticoagulant therapy with unfractionated heparin or low molecular weight heparin injection therapy (enoxaparine-Clexan, dalteparine-Fragmin, nadroparine-Fraxiparine, etc.)[10]. In certain cardiac disorders that require anticoagulant therapy, the patient's vital risk is higher than

the local hemorrhagic risk, like in the case of patients with mechanical valve prostheses. In this situation, the cardiologist cannot suppress the oral anticoagulant without the risk of obstruction of artificial valves, with the development of acute heart failure, with the risk of death. The cardiologist will administer anticoagulant injection therapy and will reduce INR values, without reaching the values of 2-2.2. The dentist will have to manage post-intervention local hemorrhage through local factors of hemostasis: use of topical hemostatic agents (collagen, fibrin, gelatin, thrombin) and suture of post-extraction wounds. Diabetes mellitus can determine the development of stroke, most frequently ischemic. The patient has additional risks in the dental office, which are derived from the underlying disease. The patient with diabetes mellitus has a risk of metabolic imbalance: development of a hypoglycemic or hyperglycemic episode, local hemorrhagic and infectious risk, slower wound healing[11]. Patients who suffer from autoimmune diseases, such as disseminated lupus erythematosus, have systemic disorder, including of the brain[12]. The patient may be under chronic antimitotic or immunosuppressive therapy[13]. Antimitotic medication acts on all cells that have a rapid turnover, such as oral mucosa and hematogenic bone marrow. In this situation, due to medullary depletion in the three cell lines, the patient in the dental office may have a hemorrhagic, infectious risk and insufficient oxygenation of peripheral tissues.An acute stroke in the process of healing can be followed by the formation of cerebral epileptic foci[14]. In a patient with sequelae of stroke, the dentist should conduct anamnesis while keeping this in mind. Most frequently, patients can have focal epileptic seizures or secondarily generalized focal epileptic seizures[15]. These epileptic seizures can or cannot be controlled by drugs at the time of the patient's visit to the dental office. The most used antiepileptics for controlling these seizures are carbamazepine and valproic acid. This chronic antiepileptic medication has side effects that may interfere with dental treatment: leukopenia, thrombocytopenia, aplastic anemia, hepatic cytolysis, hepatic cholestasis, decreased concentration of fibrinogen and/or coagulation factor VIII; platelet aggregation inhibition. The epileptic patient may have comitial seizures in the dental office or an epileptic status (comitial seizures with a duration longer than 30 minutes), with a vital risk for the patient.

Risk factors in patients with peripheral facial paralysis in the dental office

Patients with PFP may request dental medicine assistance in the acute phase of the disease. They are referred by the neurologist for the determination of the presence of dental foci that may interfere with the etiopathogeny of this disease and for their treatment. If herpes virus infection (VHS-1) is found in the etiopathogeny of PFP, the patient will be more probably immunodepressed, with a low local reactivity[16]. PFP can also be found in Melkersson-Rosenthal syndrome, characterized by: recurrent peripheral facial paralysis, folded tongue, granulomatous cheilitis (tapir mouth), with genetic load, sometimes associated with Crohn disease[17]. The patient with a tapir mouth might first seek dental assistance, thinking that this inflammation is of dental origin. The dentist should make differential diagnosis with acute apical periodontitis or vestibular abscess. Correct anamnesis and objective examination will allow the dentist to avoid the incision of a false vestibular abscess. Chronic PFP forms can become complicated by facial hemispasms that may lead to temporomandibular joint dysfunctions[18].

CONCLUSIONS

Dentists frequently encounter patients with CFP, with sequelae of stroke, because the life expectancy of patients has increased and more elderly patients seek dental assistance. The risks of these patients in the dental office are multiple due to the many general associated diseases. The dentist must approach these patients in a holistic manner in order to avoid some complications that may occur and to provide adequate oral rehabilitation. Patients with PFP have fewer risks in the dental office, but may pose greater difficulties of oral rehabilitation. The dentist may be confronted with diagnostic difficulties in the case of patients with PFP, which can be overcome through adequate anamnesis and objective examination.

Acknowledgements

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THE BIOCOMPATIBILITY OF ACOUSTIC MICRO SENSORS BASED ON MAGNETOSTRICTIVE NANOFIBERS

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ABSTRACT

Introduction: The introduction of implantable devices in the human body determines a series of issues regarding their long-term tolerance. The biological tests represent the most critical stage in the biocompatibility assessment. **Purpose of the Study:** We proposed the testing of various materials that might be used in the development of implantable devices that function as auditory sensors. **Materials and Methods:** We conducted in vivo tests (on experience animals – white rats) for the biocompatibility of magnetostrictive materials based on FeGa20 and Co75Fe10B15. We implanted a sample from each material in the interface of the subcutaneous cellular tissue and paravertebral muscles. The biochemical and cellular modifications and also the immune response are evaluated at 14, 60 and 120 days from the implantation. **Results:** The results at 14, 60 and 120 days were similar for the both types of implanted materials: normal teguments (epidermal tissue of normal thickness, numerous hair follicles, dermal and hypodermal tissues without any modifications) and a normal layer of skeletal muscle fibers. **Discussions:** The material biocompatibility was assessed by histological examination of the organsim reaction to the implantated foreign body. The lack of biocompatibility is characterised by acute or chronic inflammatory reaction at the site of implantation, with the presence of inflammatory cells as the determinant criteria. Conclusions: Based on the prelevated histological materials examined macroscopically and microscopically we can conclude that, after 3 succesive tests, the evaluated materials (FeGa20, Co75Fe10B15) are biocompatible.

Key words: biocompatibility, auditory micro sensor, $FeGa_{20}$, $Co_{75}Fe_{10}B_{15}$

INTRODUCTION

The development of implantable devices to improve or re-establish the auditory function represents a challenge for many research teams. The introduction of such devices in the human body determines a series of issues regarding their long-term tolerance.

This is the reason for the obligativity of the experience animal testing in the development of these devices. The testing is conducted by the international guidelines whose purpose include the ethics of research and avoiding of possible incidents during the introduction of these devices in the human body and by their implications in certain tissue and organism functions [1].

The organism reaction (experience animal-white lab rat) to the implantary materials consists in inflammation, hypersensitivity, foreign body reactions, encapsulation or carcinogenesis. The response of the organism may be due to the toxic products released by the material or simply to its physical presence – leading to foreign body reactions and encapsulation [2]. The biological tests

represent the most critical aspect in the biocompatibility assessment.

The biocompatibility refers to the interaction between a certain device and the tissue or the functions of the organism implanted with that device [3,4,5].

The test results of the animal model experience (white lab rat) were influenced by: the implant device material, the tissue around the implant, the period of exposure.

PURPOSE OF THE STUDY

The present study proposed the testing of various materials that might be used in the development of implantable devices able to function as auditory sensors. We conducted in vivo tests (on experience animals – white rats) for the biocompatibility of magnetostrictive materials based on $FeGa_{20}$ and $Co_{75}Fe_{10}B_{15}$.

MATERIAL AND METHODS

The tests followed the ISO 10993 standards for biological evaluation of medical devices [1]. The present experiment was conducted according to the European Union Council Directives 86/609EU regarding the using of experience animals in chronic experiments [6,7].

The first step in assessing the biocompatibility of the final device consisted in the evaluation of the biocompatibility of its components – of the magnetostrictive materials based on Fe and Ga [8,9].

The sterilization of all the tested materials on animal models was obtained by the same methods used for the final device sterilization – plasma sterilization.

The biocompatibility tests were conducted according to BioPT (Biocompatibility Planning Tool), Pacific Biolabs [10].

The dimensions of the tested material were established in concordance with the standards of the above mentioned rules: the shape of the device – rectangular, the surface of the device – 2.5 X 10 = 25 mm2.

The implantable devices maintained for a period longer than 30 days, in direct contact to various tissues, except blood, must be tested according to the present rules, regarding the following parameters: cytotoxicity, sensitivity, irritation or intradermal reactivity, acute/subacute/chronic systemic toxicity, genotoxicity, carcinogenesis and implantation.

The implantation tests (ISO 10993) determine the biocompatibility for the medical devices that will be placed in contact with living tissue (other than skin) [11, 12, 13].

The biochemical and cellular modifications and also the immune response are evaluated at 14, 60 and 120 days from the implantation through histopathological tests for the tissue surrounding the implanted material.

In the assessing of the tissue response to FeGa20 and Co75Fe10B15 we implanted a sample from each material in the interface of the subcutaneous cellular tissue and paravertebral muscles – on the median line of the thoracic spine on the experience animal (the material implantation was conducted on laboratory rat). We chronically implanted 6 bands of 2mm x 10mm = 20mm2 for 2 types of magnetostrictive materials.

The implantation was made after the general anesthesia of the experience animal (sodium pentobarbital - 35mg/kg body weight with atropine sulfate 0.5mg/kg body weight to protetct from vagal reactions), under direct vision in sterile conditions. The implanted material was previously sterilized in plasma (FeGa20, Co75Fe10B15).

The tegument was incised ℓ = 1,5cm (after previous disinfection with alcohol) on the median line; the subcutaneous tissue was incised to the paravertebral muscles and the implant material was placed. The surgical

wound was sutured with non-resorbable material (D-tek sutures, Silk, Non-Absorbable Natural, USP 4/0, ½ circle curved cutting triangular 18mm needle). We used the same suture material and the same surgical instrument types on all the implanted experience animals.

We used 2 animals for each material testing at 14, 60 and 120 days, according to DS Pharmacopeia. We macroscopically and microscopically examined the tissue reaction.

The implant was further removed with the adjacent tissue and prepared for the microscopical histological examination by haematoxylin eosin and van Gieson staining.

RESULTS

The implant induced reaction was classified according to the polymorphonuclear neutrophils, mononuclear cells and fibrous tissue presence.

The results at 14 days were as follows:

For $FeGa_{20}$ (Fig. 1 and 2):

- Normal teguments: epidermal tissue of normal thickness, with numerous hair follicles, dermal and hypodermal tissues without any modifications.
- Normal layer of skeletal muscle fibers.

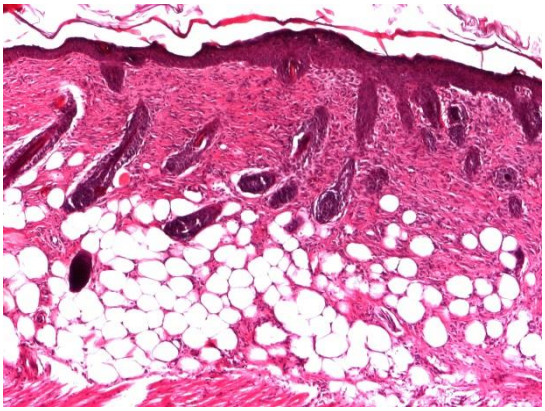

Figure 1 ($FeGa_{20}$). Skin fragment with epidermal flattening, the dissapearance of the papillary design, diffuse fibrosis and reduced diffuse chronic inflammatory infiltrate in the dermal tissue (HE, ob. x4)

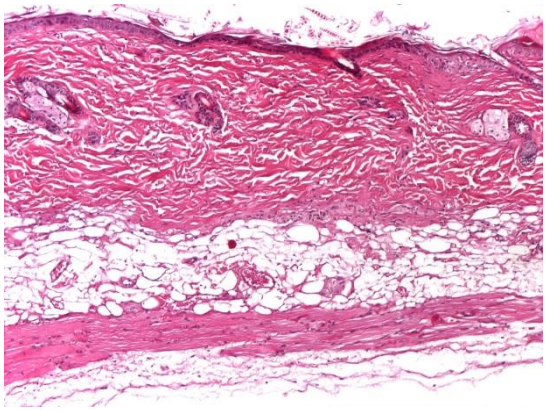

Figure 2 ($FeGa_{20}$). Skin without modifications (HE, ob. x4).

For $Co_{75}Fe_{10}B_{15}$ (Fig. 3 and 4):

- Normal teguments: epidermal tissue of normal thickness, numerous hair follicles, dermal and hypodermal tissues without any modifications. Normal layer of skeletal muscle fibers. Skin without modifications (Fig.3).

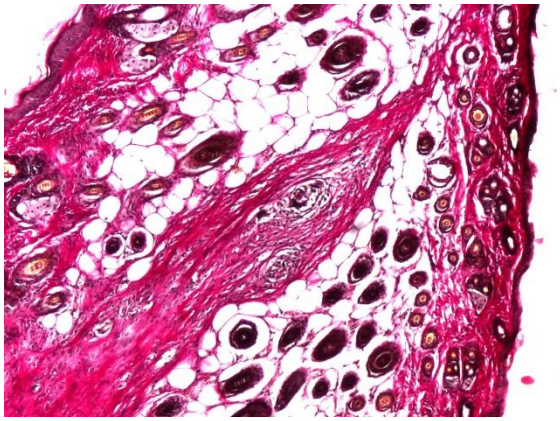

Figure 3 ($Co_{75}Fe_{10}B_{15}$). Cutaneous fragment with diffuse fibrosis in the dermal tissue and chronic inflammatory infiltrate (lymphocites) around the hair follicle (vG, ob. x4)

Teguments: epidermal tissue of normal thickness, hair follicles surrounded by chronic inflammatory infiltrate, dermal fibrosis.

Morphopatological diagnosis: Perifolliculitis and dermal fibrosis (Fig.4).

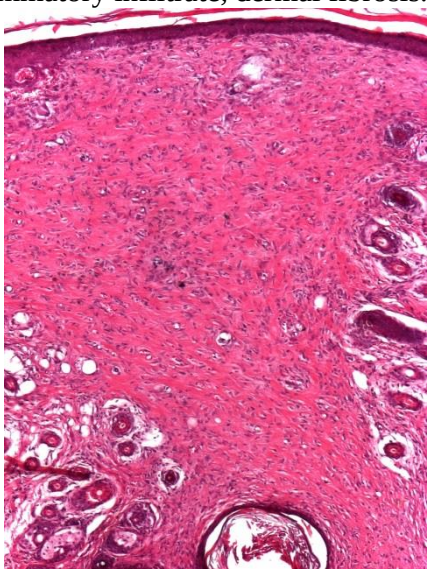

Figure 4 ($Co_{75}Fe_{10}B_{15}$): Mature cicatriceal area with feather aspect. Supra-adjacent epidermal tissue is flattened, without papillary design. The cicatriceal area is composed by mature connective tissue, with numereous collagen fibers, fibrocytes and rare fibroblasts (frequent to the surface), rare capillary vessels and discrete chronic inflammatory infiltrate (lymphocytes). (HE, ob. x4)

The results at 60 days for the magnetostrictive materials were as follows:

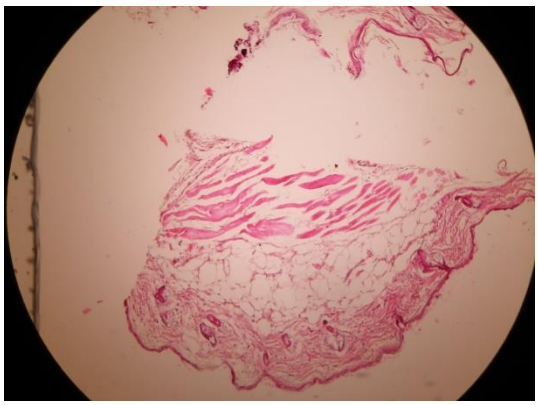

Figure 5 ($FeGa_{20}$). Cutaneous fragment (epiderm, derm, hypoderm) and striated muscle without any signs of inflammation (HE, ob. x4)

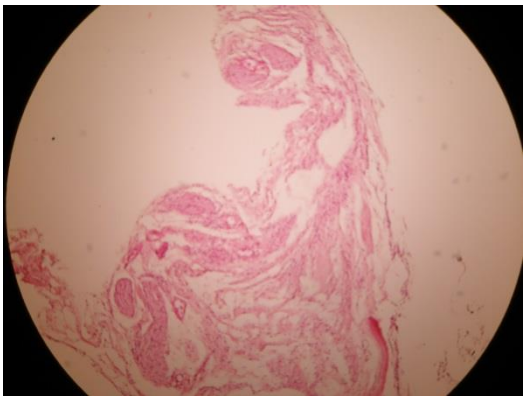

Figure 6 ($Co_{75}Fe_{10}B_{15}$). Connective tissue fragment and nerve with normal aspect (HE, ob. x4).

For $FeGa_{20}$:

- Normal teguments: epidermal tissue of normal thickness, numerous hair follicles, dermal and hypodermal tissues without any modifications.
- Normal layer of skeletal muscle fibers (Fig.5).

For $Co_{75}Fe_{10}B_{15}$:

- Connective and nerve fragment of normal aspect (Fig.6).

The results at 120 days were similar to the results at 14 and 60 days.

For $FeGa_{20}$:

- Normal teguments: epidermal tissue of normal thickness, numerous hair follicles, dermal and hypodermal tissues without any modifications.
- Normal layer of skeletal muscle fibers (Fig.7).

For $Co_{75}Fe_{10}B_{15}$:

- Teguments: epidermal tissue of normal thickness, numerous hair follicles, dermal and hypodermal tissues without any modifications.

- Normal layer of skeletal muscle fibers (Fig.8).

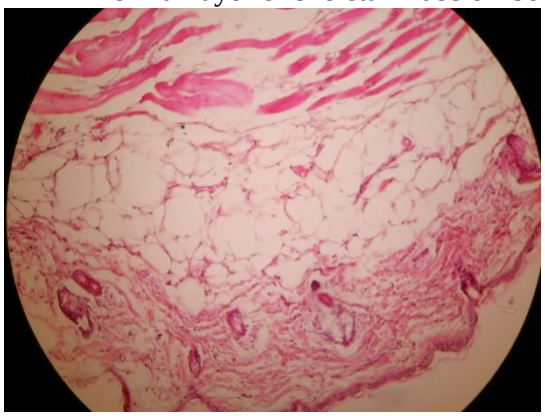

Figure 7 ($FeGa_{20}$). Cutaneous fragment (epiderm, derm, hypoderm) and striated muscle without any signs of inflammation. (HE, ob. x4)

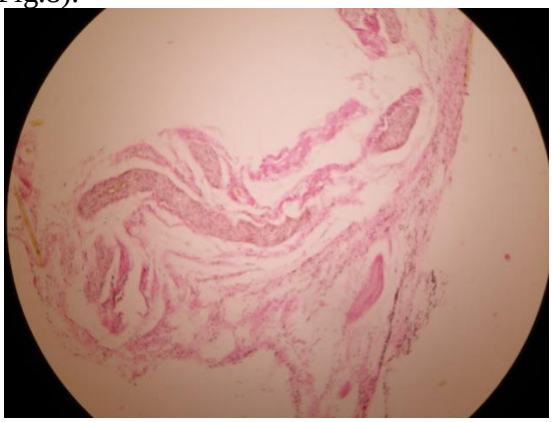

Figure 8 ($Co_{75}Fe_{10}B_{15}$). Connective and nerve fragment of normal aspect (HE, ob. x4).

DISCUSSIONS

The material biocompatibility was assessed by histological examination of the organsim reaction to the implantated foreign body. The lack of biocompatibility is characterised by acute or chronic inflammatory reaction on the site of implantation, with the inflammatory cells presence as determinant criteria [14].

In the case of biocompatibility for the implanted material a thin, mature, fibrous capsule is produced, as a sign for total resollution of the inflammatory phenomena [15].

The biocompatibility degree is apreciated by the assessment of the extension and the nature of the tissue response to the implanted material [16].

The material implantation may be characterised by:

- Acute or chronic inflammation due to: phisical presence of the material; material biocompatibility; infection.
- Foreign body reaction – due to the mechanical irritation determined by mechanical proprieties of the implant;
- The foreign body reaction increases the risk for infection that exacerbates the inflammation.

CONCLUSIONS

A good biocompatibility at the experience animal allows further studies in the magnetostrictive materials area with aplicability in human biomechanics.

Based on the prelevated histological materials examined macroscopically and microscopically we cann conclude that, after 3 succesive tests, the evaluated materials (FeGa20 Co75Fe10B15) are biocompatible. The using of the magnetostrictive materials in neurothology area may contribute to the development of a new type of acoustic sensor for profound bilateral sensorineural hearingloss patients.

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EXTRAESOPHAGEAL MANIFESTATIONS OF GASTROESOPHAGEAL REFLUX DISEASE WITH IMPLICATIONS FOR ORAL CAVITY

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ABSTRACT

Background: Gastroesophageal reflux disease (GERD) is one of the most common chronic disorders of modern humans. The manifestations of GERD are classically described as heartburn and reflux, but GERD may also present atypically. Common extraesophageal manifestations include reflux cough syndrome, reflux asthma syndrome and reflux laryngitis syndrome which leads to reduced quality of life. **Aims:** Our purpose was to study the prevalence of extraesophageal symptoms and oral manifestations associated with gastroesophageal reflux disease, to estimate the connection between them, certain risk factors and severity of the disease. **Methods:** A prospective study was performed in 154 hospitalized patients diagnosed with GERD by barium examination and in some cases by upper gastrointestinal endoscopy and 40 controls with extradigestive diseases. They were screened for oral changes including dental evaluation. **Results.** The prevalence of extraesophageal symptoms increases significant from 31,81% to 79,22% if oral manifestations are taken into account. We identified statistically significant increased prevalence of oral manifestations in GERD patients: dental erosion 42,2%, oral burning sensation, halitosis, impaired taste, hypersalivation, tooth sensitivity. However the prevalence of caries and other periodontal lesions was similar in reflux patients and controls. Oral symptoms in GERD are likely to be associated with smokers, alcohol intake, consumption of soft drinks and other extraesophageal manifestations. Hiatal hernia and esophagitis were found with a greater frequency in patients with oral symptoms reflecting a severity of the reflux disease more marked or a longer period of evolution. **Conclusion:** Oral manifestations, other than caries and periodontal lesions are a common finding in patients with GERD and should be considered an atypical manifestation of this disease. Collaborative medical and dental management is therefore required to establish early diagnosis and to prevent a lifetime of debilitating dentition and the need for complex restorative therapy.

Key words: gastroesophageal reflux disease, oral manifestations, extraesophageal symptoms

BACKGROUND

Gastroesophageal reflux disease (GERD) is one of the most common chronic disorders encountered in medical practice becoming a public health problem considering its possible severe complications (Barrrett esophagus and esophageal cancer). The prevalence of the disease in the general population is differently reported in various studies ranging from 20-50% (1), due to the polymorphic clinical symptoms and to subsequent investigations

that are needed to confirm the diagnosis. The clinical spectrum combines digestive signs (esophageal) and extradigestive symptoms depending of the presence or absence of esophagitis, the composition of the reflux, the period of contact with the esophageal mucosa and the tissue resistance. Classical symptoms of GERD considered as typical manifestations include heartburn, acid regurgitation, retrosternal pain, dysphagia, odynophagia (1). However some patients may experience atypical or extraesophageal manifestations (2) by direct injury of the larynx or pharynx caused by contact with gastric acid and by esophagobronchial reflex which is mediated by the vagus nerve. Most important expressions are chronic cough, asthma, aspiration pneumonia, laryngitis, posterior pharyngeal ulcers, angina-like chest pain, arrhythmias. A number of studies (3, 4) have shown the involvement of gastroesophageal reflux disease in the occurrence of dental erosion, sometimes severe, that need complex and expensive restorative treatment. In the present study we intended to identify oral changes in patients with gastroesophageal reflux disease and to evaluate possible correlations with risk factors, other extraesophageal manifestations or the severity of the disease.

OBJECTIVES

The aim of this study is to establish the prevalence of gastroesophageal reflux disease considering the patients presenting both esophageal and extraesophageal manifestations. We also analyzed the prevalence of extraesophageal symptoms in patients with gastroesophageal reflux disease and in particular to study the frequency of the oral manifestations. There have also been evaluated the potential risk factors for GERD, external lifestyle factors related to diet, alcohol, coffee, tobacco and some soft drinks along with the endogenous factors represented by hiatal hernia. The presence of general diseases such as diabetes, obesity, pulmonary chronic diseases, constipation was taken into account.

MATERIALS AND METHODS

To reach our goal we conducted a prospective study on patiens hospitalized in the Vth Internal Medicine Clinic from Hospital CF Iasi who experienced digestive symptoms, more precisely heartburn, retrosternal pain, regurgitation, anorexia, dysphagia as well as patients with extradigestive manifestations, reported in the literature as possible events in gastroesophageal reflux disease. Barium X – Ray examination and in some cases upper gastrointestinal endoscopy were performed in all the patients. The patients who have been diagnosed with gastroesophageal reflux disease completed a questionnaire regarding demographic data, height and weight in order to determine nutritional status, symptoms, alcohol and coffee intake, soft drinks, tobacco, concomitant medication (nonsteroidal anti-inflammatory drugs, beta blockers, theophylline, benzodiazepines), comorbidities (chronic obstructive pulmonary disease, diabetes, chronic constipation). All patients with gastroesophageal reflux disease underwent a clinical examination of the oral cavity. According to the presence or the lack of oral manifestations they were divided into two groups which were compared in terms of risk factors, association with other symptoms of gastroesophageal reflux disease. The group with oral changes was also compared with a group of 40 patients hospitalized with extradigestive medical conditions such as angina, hypertension, kidney stones or rheumatic conditions. Patients treated with histamine receptor blockers or proton pump inhibitors and those diagnosed with duodenal ulcer, gastric cancer or gastrectomy were excluded. Recorded data were analyzed

statistically, a value of p <0.05 being considered statistically significant.

RESULTS

Out of the 189 patients 154 (81.48%) were diagnosed with gastroesophageal reflux disease by X-ray or endoscopy. Patient's age ranged between 38 and 78 years, with an average of 56.2 and 26% of patients were over 65 years old. Gender distribution was 93 men, 60.38% respectively and or 61 women (39.62%). Out of the 154 patients 111 (72.07%) had typical esophageal symptoms including heartburn (52.5%), 55.19% regurgitation, dysphagia 14.28%, 12.98% odynophagia, retrosternal pain 36, 36%. Out of the 154 recruited patients 111 (72,07%) were found to have typical esophageal symptoms including heartburn (52,5%), acid regurgitation (55,19%), dysphagia (14,28%), odynophagia (12,98%), retrosternal pain (36,36%). Out of the total of 111 patients only 32 (20.77% of all 154 patients with gastroesophageal reflux disease) were having only esophageal symptoms, the remaining 79 patients (51.29%) were associating other manifestations, including oral complains.

Taking into account oral changes, a total of 122 patients (79,22%) were found to have extraesophageal manifestations associated (in51,29%) or not (27,93%) to the typical esophageal symptoms. Note that of the 111 patients with tipical digestive complaints 22 (representing 14.28% of the total of 154 patients) had other than oral associated extradigestive complains, the rest of 89 patients (57.79%) showing exclusively digestive symptoms, with or without changes in the oral cavity. A total of 43 patients or 27.93% of the total patients experienced only esophageal symptoms.

If we considered as extraesophageal manifestations only the respiratory or othorhinolaryngological symptoms, excluding the oral involvement their prevalence were reduced to 31.81% of all patients, reaching 14.28% as manifestations associated with esophageal symptoms and 17 53% as exclusive extraesophageal events.

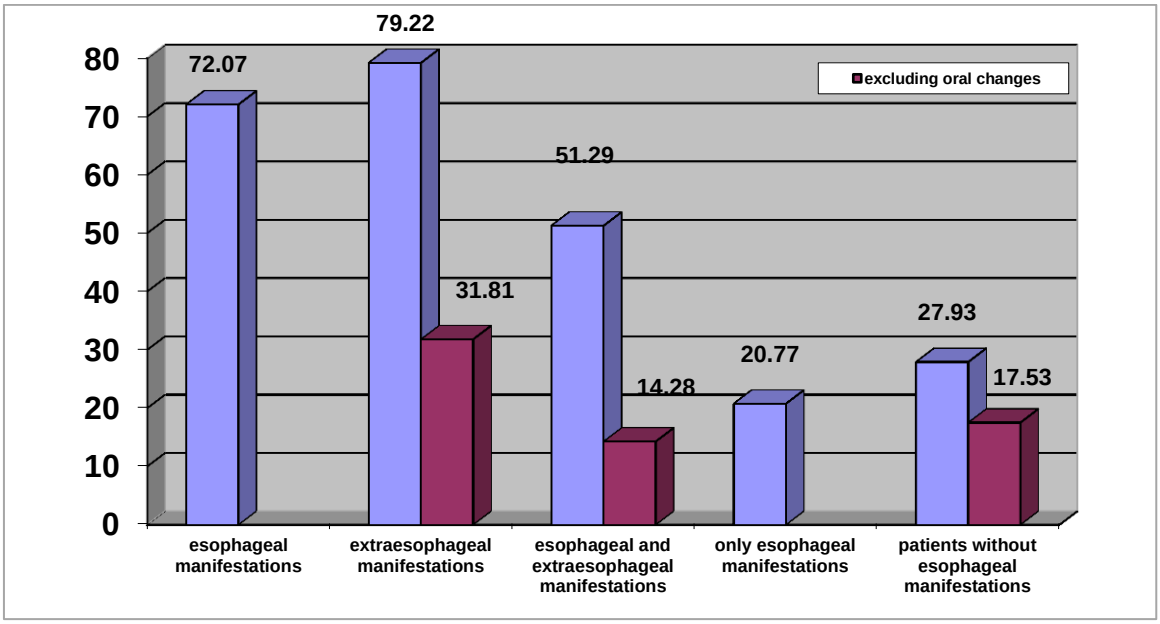

Figure 1. Symptoms presented by patients with gastroesophageal reflux disease

Patients diagnosed with gastroesophageal reflux disease were questioned on symptoms presented in the oral cavity as oral burning sensation, halitosis, impaired taste, sour or

acid taste, hypersalivation, tooth sensitivity, abrasive sensation. All patients with gastroesophageal reflux disease underwent a clinical examination of the oral cavity. Oral changes were recorded in 114 patients respectively 74.02% (figure 2), including dental erosion and aphtosis. Of the 111 patients with esophageal complains, 75 (67.56%) were found to associate oral manifestations. Of the 89 patients with strictly digestive symptoms 57 or 64.04% showed changes in the oral cavity, while patients with digestive complaints associated to respiratory or othorhinolaryngological symptoms presented oral complaints in a significantly more important percentage (81, 81%) suggesting that the reflux disease was more severe. 36 patients with esophageal complaints had no changes in the oral cavity.

Among patients without esophageal complaints, 16 had only oral cavity expression, representing 10.38% of all patients with gastroesophageal reflux disease. 23 (85.18%) of the 27 patients with respiratory symptoms (chronic cough, shortness of breath at night) or laryngeal symptoms had associated manifestations in the oral cavity. It resulted a number of 39 patients from 43 (90.69%) with extraesophageal manifestations that presented changes in the oral cavity.

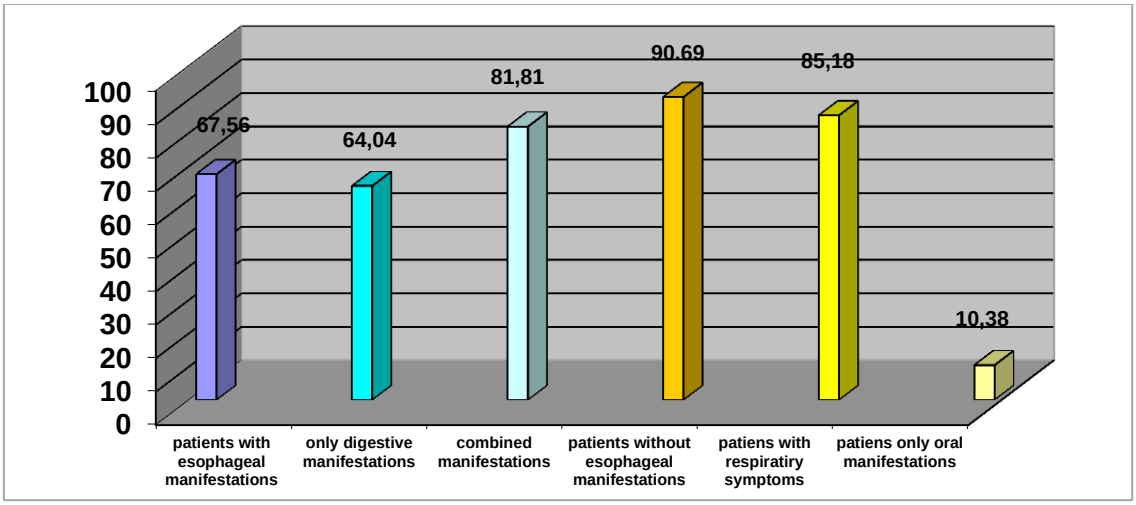

Figure 2. Prevalence of oral manifestations in different categories of patients with gastroesophageal reflux disease

Patients with changes in the oral cavity were compared in terms of demographic characteristics and risk factors with those without changes at this level (Table 1). Among the first group we found a slightly higher percentage of males 62.28% versus 55%. High prevalence of oral manifestations seems not to correlate with age, the percentage of patients over 65 years being similar in both groups. Oral symptoms in GERD are likely to be associated with smokers, alcohol intake, consumption of soft drinks but obesity and diabetes showed no statistically differences. Drugs reported in the literature as favoring gastroesophageal reflux (theophylline, calcium blockers, bisphosphonates, antidepressants, beta blockers, benzodiazepines, nonsteroidal anti-inflammatory drugs) have been used more frequently in patients with oral symptoms.

Patients without oral changes were generally diagnosed on the basis of esophageal complains. A percentage of 65% of patients with changes in the oral cavity, especially those with dental erosions, also associated esophageal symptoms, especially

heartburn, acid regurgitation and retrosternal pain and even more serious complains, such as dysphagia (14.03%). Moreover, a large amount of them had other extraesofaphageal manifestations like cough (22.8%), dysphonia (13.15%), dyspnea (10.5%). We suggest that dental erosions are associated with more severe or prolonged reflux disease possibly due to the fact that presenting atypical manifestations or exclusively oral signs (14.03%) the patients request medical consultation after a longer period of time.

Barium X-ray identified the presence of hiatal hernia in 35 of the 114 patients (30.7%) with oral manifestations, while its prevalence in the control group was 15%. Upper endoscopy was performed on 29 patients with oral lesions, observing oesophagitis lesions in 16 of them (55.17%), and severe erosive esophagitis in 6 cases. In patients without oral changes endoscopy was practiced only in 8 patients and mild reflux esophagitis was identified in 2 patients.

Table 1. Risk factors for gastroesophageal reflux disease in patients with and without oral manifestations

	Patients with oral manifestations n=114	Patients without oral manifestations n=40	P
Average age	65±10	52±4	<0,05
Patients over 65 years	29 (25,43%)	11 (27,5%)	0,03
Male	71 (62,28%)	22 (55%)	<0,05
Smokers	45 (39,47%)	12 (30%)	<0,05
Alcohol intake	25 (21,9%)	5(12,5%)	<0,05
Soft drinks intake	27 (23,68%)	6 (15%)	<0,05
Esophageal manifestations	75 (65,78%)	36 (90%)	0,03
Extraesophageal manifestation	45 (39,47%)	8 (20%)	0,04
Obesity	74 (64,9%)	24 (60%)	NS
Diabetes mellitus	16(14,03%)	4 (10%)	NS
Drugs	36 (31,5%)	9 (22,5%)	<0,05
Asthma , COPD	19 (16,66%)	5 (12,5%)	NS
Hiatal Hernia	35 (30,70%)	6 (15%)	<0,04

The oral manifestations identified in the patients studied are shown in table ii compared with those recorded in a group of 52 controls without gastroesophageal reflux diagnosed with extradigestive conditions as angina, hypertension, kidney stones, rheumatic conditions. Patients were comparable in terms of age and sex without statistically significant differences in terms of chronic alcohol consumption or tobacco and similar proportion of obese patients.

Table 2. The prevalence of oral manifestations in patients studied

	Lot studiu n= 154	Lot martor n=52	
Average age	56,2	55,3	NS
Smokers	57 (37,01%)	18 (34,61%)	NS
Alcohol intake	30(19,48%)	7 (13,46%)	NS

Obesity	95 (61,68%)	30 (57,69%)	NS
Dental sensitivity	79 (51,29%)	9 (17,30%)	0,005
Abrasive sensation	26 (16,88%)	1 (1,92%)	0,04
Dental erosions	65 (42,20%)	8 (15,38%)	0,03
Caries	133 (86,36%)	42 (82,28%)	NS
Burning sensation	52 (33,76%)	2 (3,8%)	0,005
Impaired/sour or acidic taste	81 (52,59%)	3 (5,76%)	0,001
Halitosis	51 (33,11%)	6 (11,53%)	0,04
Periodontal disease	37 (24,02%)	11 (21,15%)	NS
Aphtosis	27 (17,53%)	3 (7,5%)	0,04

It appears that the enamel erosions were more common (42.20% vs. 15.38%) and involved a higher number of teeth per person in patients with gastroesophageal reflux disease. Lingual and palatal surfaces were especially interested and dental erosions were generally accompanied by other oral manifestations such as an abrasive sensation, tooth sensitivity, burning sensation, aphtosis.

Surprisingly, the prevalence of dental caries showed no difference between groups, although theoretically acid environment could be a cause for their development. Perhaps other extrinsic factors (microorganisms from the board) and intrinsic host factors play a more important role or maybe the frequent association of bad breath and unpleasant taste has considerably increased oral hygiene measures. More abundant salivary flow with a buffer role may also be involved.

CONCLUSIONS

Gastroesophageal reflux disease is a common chronic disease in medical practice. Most patients have typical esophageal symptoms but frequently they associate extraesophageal complaints or those may be the only manifestation of the disease, their prevalence being greater when oral changes are included (79.22% versus 31, 81%).

The results showed a strong correlation between oral manifestations and gastroesophageal reflux disease, being found in a rate of 74%, more common in men, smokers, alcohol and carbonated drinkers and patients consuming drugs that affect the lower esophageal sphincter tonus. Patients with changes in the oral cavity showed esophageal complaints with a rate of 65% but comparing to those without oral manifestations they associated more frequently extraesophagial symptoms (40%), hiatal hernia and sometimes severe oesophagitis lesions suggesting a more severe or prolonged reflux disease.

A percentage of 14.03% of patients with oral changes did not have any other complain so that the dentist may be the first to suspect the presence of gastroesophageal reflux disease requiring collaboration with the internist or the gastroenterologist. On the other hand, physicians should be informed on the important prevalence of oral manifestations in patients with reflux disease because some of them, as dental erosions, may develop silent till advanced stages. For this reason oral modifications should be considered as extraesophageal manifestations of gastroesophageal reflux disease and dental checkup should be mandatory for early detection and implementation of preventive or therapeutic measures.

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SYSTEMIC CORTICOSTEROIDS ASSOCIATED WITH INTRATYMPANIC CORTICOSTEROID TREATMENT FOR IDIOPATHIC SUDDEN HEARING LOSS

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ABSTRACT

Objectives In this study we analyzed hearing recovery rates in patients diagnose with ISSHL after steroid treatment. We evaluate the therapeutic efficacy of intratympanic dexamethasone (ITD) injections added to systemic steroids(salvage therapy) in patients with idiopathic sudden sensorineural hearing loss (ISSNHL) and of ITD therapy as first line therapy. **Methods** A retrospective chart review was performed for patients diagnose with ISSNHL from last three years. Inclusion criteria define ISSNHL. Patients were treated with systemic corticoid therapy (Solu-medrol) and/or intratympanic therapy (Dexamethasone). **Results** Outcomes were analyzed as a function of the type of therapy, time to treatment and response. 68,8% of patients responded to treatment with steroid, while 42,22 % failed initial treatment with systemic steroid. 36,8 % of the non-responders to systemic therapy, opted to receiving ITS salvage therapy. **Conclusion** Current findings recommend treating ISSNHL with both ITS and OS initially. In patient who do not tolerate OS, ITS should be attempted as first line therapy. ITS injections are an effective salvage therapy after failure with OS.

Key words: sudden hearingloss, steroid, intratympanic dexamethasone

INTRODUCTION

Idiopathic sudden sensorineural hearing loss (SNHL) is defined as a decline in hearing over 3 days or less affecting 3 or more frequencies by 30 dB or greater with no identifiable etiology.

Sudden SNHL affects between 5 and 20 persons per 100,000 year or approximately 4,000 new cases annually in the United States.2 The HL is nearly always unilateral and is commonly associated with tinnitus and aural fullness. The true incidence of sudden SNHL is probably underestimated because many who recover hearing early (within the first few days) are unlikely to seek medical therapy.

The etiology, natural history, and treatment of this disorder have been subjects of debate for many years. The postulated pathophysiology for idiopathic sudden sensory hearing loss (ISSHL) has 4 theoretical pathways, as follows(1):

- Labyrinthine viral infection
- Labyrinthine vascular compromise
- Intracochlear membrane ruptures
- Immune-mediated inner ear disease.

Each theory may explain a fraction of the episodes of sudden sensory hearing loss, but none of the existing theories individually could account for all episodes.

Possible causes include the following:

- Infectious diseases.

- Trauma, such as a head injury
- Neurologic and Neoplastic Lesions: as auditory tumor and/or surgery, Multiple Sclerosis
- Immunologic diseases such as Cogan's syndrome.
- Ototoxic drugs
- Circulatory problems
- Relation to disorders such as Ménière's disease.

The treatment of patients with sudden SNHL remains varied among otologic centers with no standard protocol universally accepted. Multiple treatment protocols and agents have been proposed to treat SNHL. Steroids, antiviral agents, anticoagulants, vasodilators, antiinflammatory agents and others have been proposed as therapeutic agents to treat sudden SNHL, most of which propose some benefit in the treatment of sudden SNHL. The only treatment that has proven to be effective in the treatment of sudden sensorineural hearing loss is the corticosteroid drugs. A short course steroid will, in the majority of patients, improve the recovery of their hearing. The amount of recovery that can be anticipated is based on a variety of factors, the most important of which is how severe the hearing loss is. It is important that the corticoid be administered as soon as possible after the onset of the hearing loss as we have only a limited amount of time during which the hearing loss remains reversible. For many years the most accepted treatment of sudden SNHL was systemic steroids. Although the mechanism of the action of steroids in the inner ear remains unclarified and the optimal dose of administration is currently unknown, higher concentrations of the therapeutic agent in the cochlea are associated with greater hearing recovery(2). The blood-labyrinth barrier, which limits the transportation of molecules from blood to cochlear tissues and the limited blood flow to the cochlea reduce cochlear treatment effectiveness, because bioactive molecules usually require time over which to produce their pharmacological actions. In addition, it has been shown in animals and humans, that systemically applied glucocorticoids reach only low drug concentrations in the perilymph. However, systemic corticosteroids may have serious side effects and are contraindicated in patients with peptic ulcer, glaucoma, diabetes, and tuberculosis, as well as those who are pregnant. The local application of drugs to treat inner ear diseases is expected to provide advantages as compared with systemic treatments, namely 1) bypassing the blood-labyrinthine barrier, 2) resulting in higher concentrations in the inner ear fluids despite the lower total amount of drug given, and 3) avoiding major unwanted effects of systemically administered medications. Although the efficacy has not been definitively proven, intratympanic steroids as a therapeutic option for sudden HL is increasingly used in the United States. The variability that exists in treatment protocols for sudden SNHL also applies to protocols that involve intratympanic steroids. The use of intratympanic steroids has evolved into 3 main protocols for treatment of sudden SNHL(1):

- As an initial or primary treatment for sudden SNHL without systemic steroids;
- As adjunctive treatment given concomitantly with systemic steroids for sudden SNHL;
- As "salvage therapy" after failure of systemic steroids for sudden SNHL.

The primary reason for the use of intratympanic steroids without systemic steroids is in patients who cannot tolerate systemic steroids or those at greater risk for complications from systemic steroids (e.g., diabetics). Like most proposed therapies, the efficacy of intratympanic steroid therapy in the treatment of sudden HL has yet to be

determined, the majority of the literature concerning the use of intratympanic steroids in the treatment of sudden SNHL has reported the experience in treatment after failure of systemic therapy. The procedure is well tolerated and relatively easy to perform. As an office-based procedure done under local (topical) anesthesia, there is an avoidance of general anesthesia. Unlike systemic therapies, intratympanic therapy allows for the selection of the affected ear to be treated. In addition to glucose intolerance and avascular necrosis of the hip, other less severe side effects of systemic steroids such as insomnia, irritability, gastritis, and mood changes may potentially be avoided with topical therapy.

The primary disadvantage of intratympanic steroids is the lack of proven efficacy and/or superiority over systemic steroids. Other disadvantage is the potential early and uncontrollable loss of the solution through the Eustachian tube. Moreover, it should be noted that the round window niche (RWN) can be obstructed by pseudomembranes that may impede the diffusion of the steroid into the inner ear .(1)

Techniques also differ in method of delivery: transtympanic needle injection delivery through a myringotomy, delivery through a myringotomy with a tube, delivery with a wick placed in a myringotomy (Micromedics, Eagan, MN), and delivery through an implantable pump (Round Window m-Cath; DurectCorp., Cupertino, CA) to deliver the steroid as a constant infusion. The length of time and number of injections in which patients are treated with intratympanic steroids also differs ranging from a single day to weekly transtympanic injections to multiple weeks with self administered steroid drops to transtympanic injections given several times per week or to an implantable pump.(1).

OBJECTIVE

This study aims to review all cases of isshl treated in our institution and to analyse the postreatments auditory recovery after using three methods of corticoid delivery.

MATERIAL AND METHODS

Retrospective study over a period of three years (2010-2012) that included 45 patients diagnosed with idiopathic sudden sensorineural hearing loss.

The use of intratympanic steroids has evolved into 3 main protocols for treatment of sudden SNHL (Fig.3).

Inclusion criteria

Hearing loss 30 dB in 3 consecutive frequency within 72 h;
No initial treatment before;
Sudden hearing loss must be unilateral.

Exclusion criteria

Presence of acute or chronic otitis media;
Had previous otologic surgery;
Trauma;
Presence of a neoplasm;
Recent application of radiotherapy and/or chemotherapy;
Recent use of ototoxic drugs;
Liver or renal dysfunction;
Syphilis;
Retro-cochlear lesion.

Systemic steroid treatment

Patients treated with systemic protocol were hospitalized 7 days and treated with 250 mg of methylprednisolone i.v. as well as Pentoxifilin and vitamins. This group was fed with low-salt diet and ordered antacid treatment to avoid systemic complications of steroids.

Intratympanic (ITD) therapy - was used as a primary or as a salvage therapy methods

(solution in patients with refractory ISSNHL after systemic treatment)

After we confirmed intact tympanic membrane and middle ear status, local anesthesia was administered with lidocaine 10% pump spray (Xylocaine, 10 mg/dose), which was applied onto the tympanic membrane for approximately 15 minutes. While the patient lied in the supine position with the head tilted 45° to the healthy side, a 25-gauge spinal needle was introduced into the anterosuperior portion of the tympanic membrane, and 0.3 to 0.4 mL of 5 mg/mL dexamethasone was instilled through the perforation. During this procedure, patients were instructed to avoid swallowing or moving for 30 minutes. ITD application was performed on the first, third, and fifth days (total of 3 times) during a 5-day hospitalization.(2)

Audiologic evaluation was performed before the beginning of treatment and at 7th days of treatment. Puretone hearing thresholds were obtained for 500, 1,000, 2,000, and 4,000 Hz. Pure-tone average (PTA) was calculated according to these 4 frequencies.

RESULTS

The criteria used to evaluate the results in this study were - time between onset (Fig.1) and corticoid treatment initiation, hearing loss degree(Fig.2), delivery treatment method and hearing recovery rate.

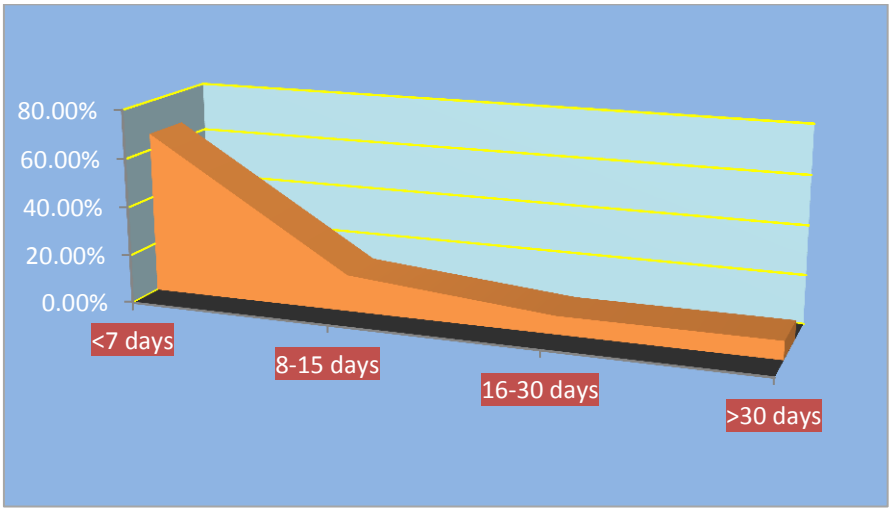

Figure 1. Pacient distribution by time between ISSHL onset and corticoid treatment initiation

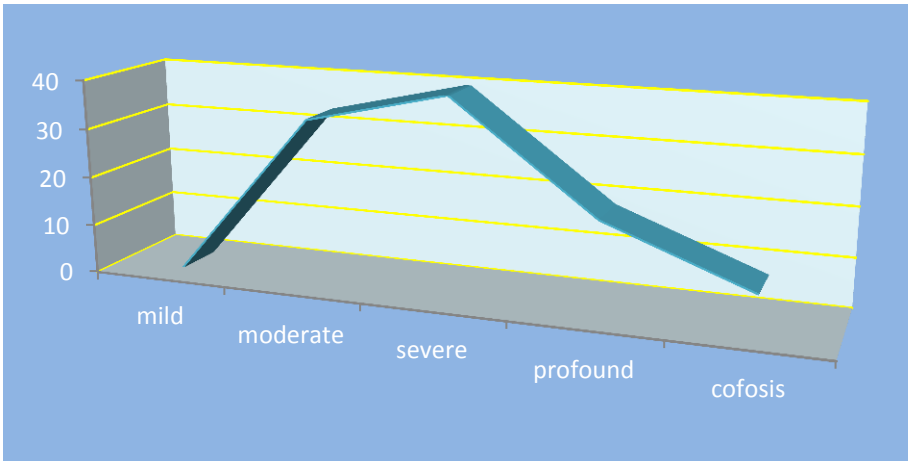

Figure 2. Hearing loss degree

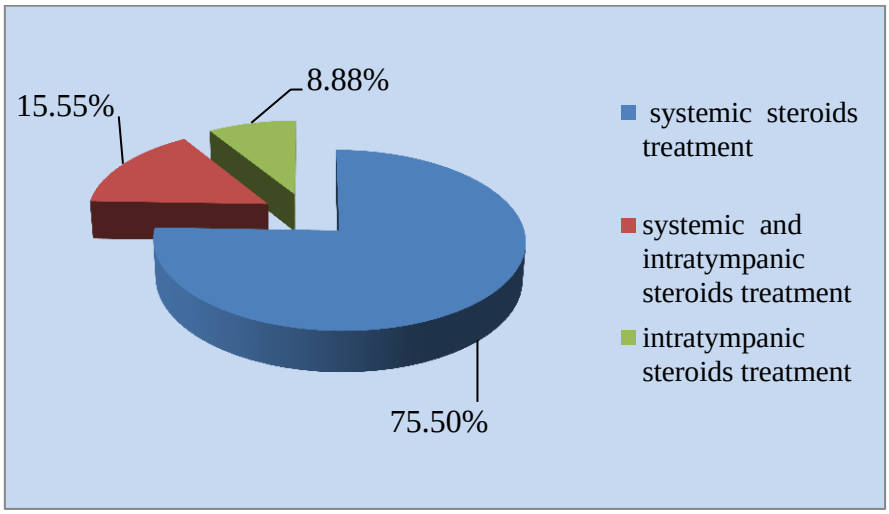

Figure 3. Steroids treatment delevery methods

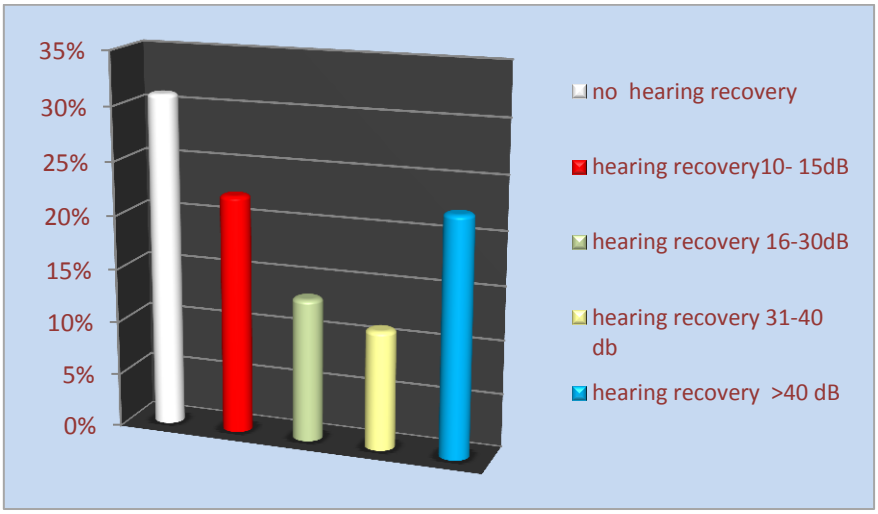

Figure 4. Hearing recovery rates

Hearing recovery rate was 68.8% (31 patients out of 45) using the three methods of administration of corticosteroid medication(fig.4). Of the 42.22% of patients who initially did not achieved a hearing recovery after systemic corticosteroid treatment, a percentage of 36.8% of patients accepted the intratympanic delevery method of corticosteroid, and in final 71% of those recorded at the end of treatment hearing recovery, thereby reducing at the 31% rate of patients without auditory posttherapeutic recovery.

At 8.88% of patients it was used only intratympanic corticoid medication as initial therapy solution, resulting in 75% of these cases hearing recovery (partial or total).

DISCUSSIONS

Intratympanic steroid therapy of ISSNHL seems to be a valuable solution in patients with refractory ISSNHL. As salvage therapy, intratympanic steroids offer the potential for some degree of additional hearing recovery, although it remains uncertain if this improvement is clinically significant and what percentage of patients is likely to show benefit(3).

Additionally, as primary therapeutic option, local steroids can be considered at least as effective as systemic steroids. Concerning the combination of topical and

systemic therapy, our results are also encouraging. Thus, this relatively new method of therapy needs further study in controlled, randomized, multicenter trials.

Acknowledgements

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Contract Code: POSDRU/107/1.5/S/78702 Partner 1: "Gr T. Popa" University of Medicine and Pharmacy Iasi.

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GUIDED TISSUE REGENERATION IN LOCALIZED GINGIVAL RECESSION

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ABSTRACT
Ensuring the integrity of the oral tissue complex depends primarily on the regenerative capacity of the patient's body but also on the materials and methods used within the regenerative therapy. Authors have proposed to summarize the regenerative treatment methods available to update the clinician the methods and recent developments in the research. Personal experience is presented for guided regeneration of oral tissues insisting on patient management where such treatment is recommended.

Key words: metal-ceramic crowns, gingival recession, guided tissue regeneration

INTRODUCTION

Metal-ceramic crowns have always been the most popular indirect restorations used in the frontal zone, due to the translucent appearance of porcelain and resistance of the metal substructure (1). Essential requirements for clinical success of metal-ceramic crowns are a perfect marginal adaptation, fracture resistance, physiognomy. An incorrect marginal adaptation will favor plaque accumulation, thereby promoting secondary caries, periodontal disease development (2).

Appearance of gingival tissue surrounding the teeth plays an important role in ensuring aesthetics, especially in the anterior zone. Metal-ceramic crowns can sometimes be associated with gray discoloration in the cervical third of the teeth due to thinness of the porcelain in this area (3) and metal oxide layer of dark color created by conventional alloys corrosion which disseminates in gingival tissues creating a tattoo. Location of subgingival crown margins may have harmful effects on gingiva; they can be difficult to clean favoring the gingival inflammation (4).

While each organism has its own regenerative capacity to provide oral health, injuries of these tissues, damage and traumatisms, are often irreversible. This ability is modulated by current materials and methods applied in regenerative therapy (5, 6).

In this paper we will review the regenerative treatment methods in order to update to the clinician the available methods and recent developments in research and personal experience concerning guided regeneration of oral tissues.

MATERIAL AND METHODS

NM patient, male, aged 25 years, presented 10 months ago at Private Dental

Office "dr. Anca Rusu", București, accusing esthetic and mastication disorder induced by the metal-ceramic crowns on 21 and 22 accompanied by fetid halitosis (Fig. 1).

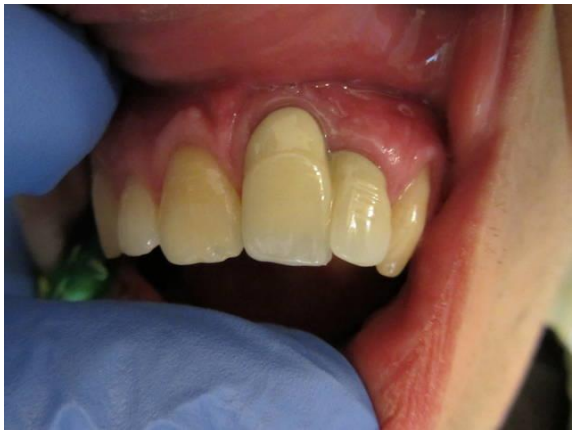

Figure 1. Metal-ceramic crowns on 21-22, gingival recession

Following clinical and radiological examination (Fig. 2) the following issues were noticed: at the level of 21 a periapical granuloma consecutive to chronic apical periodontitis, vertical bone resorption along root fracture, gingival recession, an incomplete root filling, and at level of 22 external root resorption plus incomplete root filling. All these clinical issues in conjunction with those radiological have argued the therapeutic decision of extraction of 21 and 22.

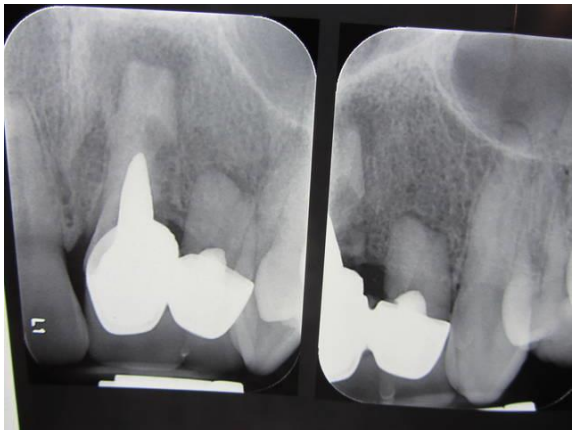

Figure 2. Radiography at 21-22 (periapical granuloma, vertical bone resorption)

RESULTS AND DISCUSSIONS

The treatment of patient lesions is presented in stages, with an emphasis of results after each step, insisting on evolutionary perspective and final effect. Guided tissue regeneration surgeries (GTR) were performed with muco-periosteal flaps fully reflected and old metal-ceramic crowns were cut and separated (Fig. 3) in order to make the extraction of 21 and 22 (Fig. 4).

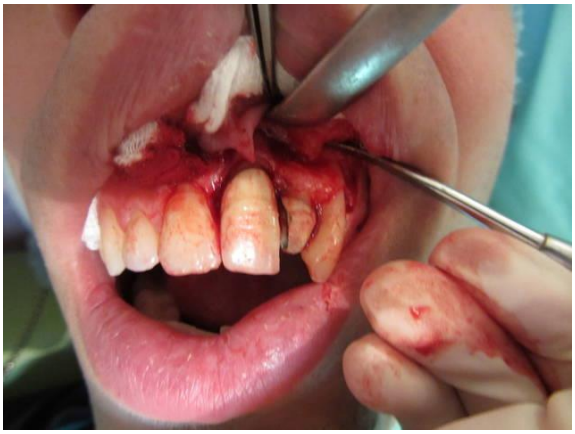

Figure 3. Intraoperative aspect, metal-ceramic crowns cut out and separated

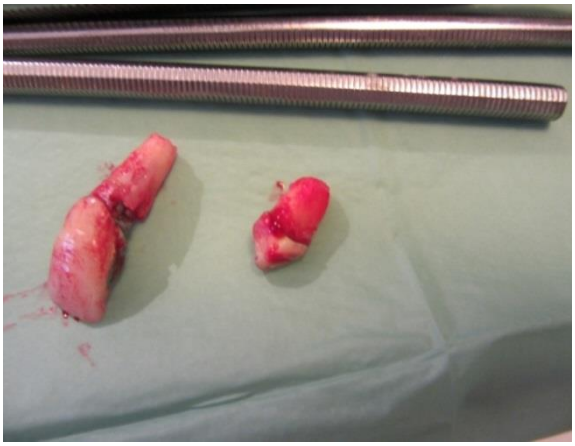

Figure 4. Teeth from 21 to 22 extracted

Examination reveals the appearance of sockets after extraction with vestibular bone defect at the level of 21 (Fig. 5).

Marginal periodontium deficit was covered by a vestibular mucoperiostal flap

fully reflected, later deperiosted in order to fully coverage of the bone addition, and on the

palatal side by a pedicle flap of connective tissue graft rotated to facial side with which was reconstituted the gingiva deficit in height (Fig. 6).

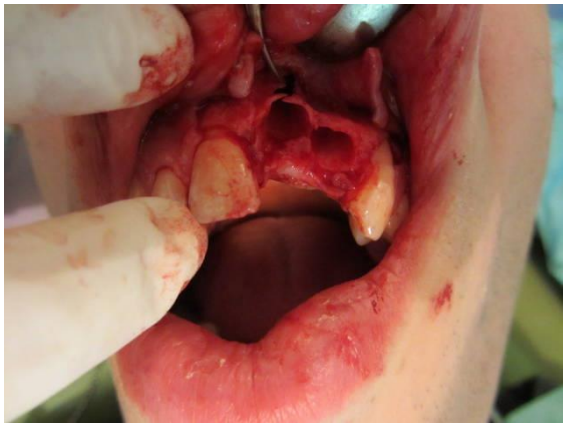

Figure 5. Sockets after extraction of 21 and 22

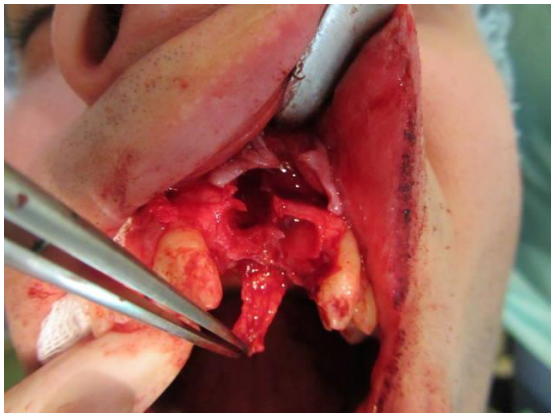

Figure 6. Palatal flap used in reconstruction.

Lateral and vertical bone augmentation was achieved with a mixture of Cerabone and own harvested bone and addition of a pericardium membrane (Jason-Botiss) (Fig. 7). After 7 days the patient returned to the control and for the extraction of sutures (Fig. 8).

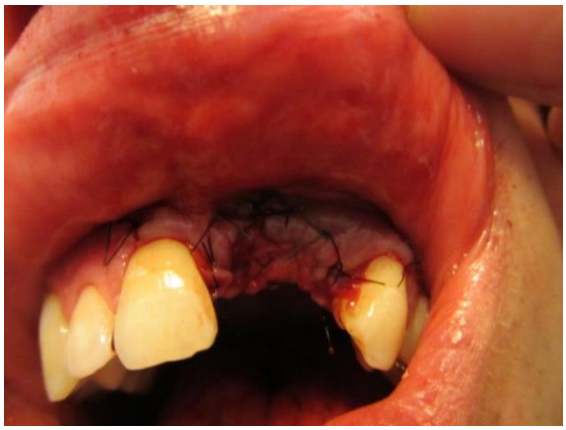

Figure 7. Intraoperative aspect after bone augmentation

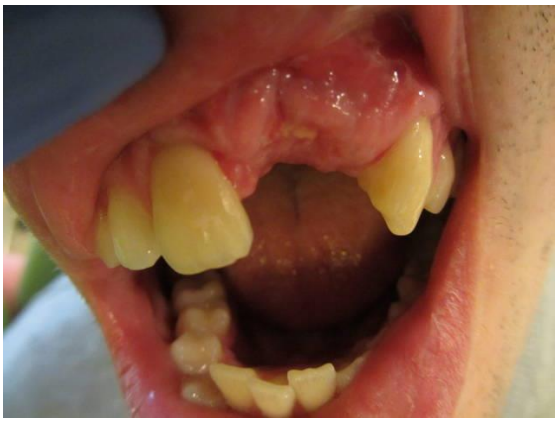

Figure 8. Aspect after 7 days of surgery.

After 6 months of intervention was made a new x-ray examination in order to control the alveolar crest anatomy and it was found the recovery of bone deficiency (fig. 9).

In order to correct the physiognomic deficit was made a temporary acrylic bridge anchored with fiberglass band and composite to the adjacent teeth so may be observed the new obtained level of the gingiva (Fig. 10).

The operations with fully reflected muco-periosteal flap are indicated in mixed periodontal recessions with or without the presence of periodontal pockets (secondary inflammation). The flap operation aims to remove necrotic and infected tissue from the periodontal pockets (7).

Because after 6 months the ridge appearance indicates a sufficient thickness and height for inserting implants, it was decided to insert two titanium cylinder-conical implants blue sky from Bredent of 3.5 to 12 mm (length and diameter). These types

of implants were chosen because have a similar form of gingiva, the surface of the head is smooth and glossy thus preventing the mucosal irritation, their attachment to the gums is optimal leaving a free important space, both vertically and horizontally and are very economical in terms of the number of used parts thus responding to aesthetic and dento-gingival demands (Fig. 11).

Usually the therapeutic approaches for replacement of losses of oral tissues

aim to relieve pain and restore mechanical function. Commonly used synthetic materials can not reproduce the physiological properties of the original tissue.

Consequently, regenerative treatment options have multiplied in the last decade,

expansion of research in this respect for tissue engineered and periodontal tissue transplantation (8), embryology and developmental biology (9) or stem cell therapy (9, 10, 11) brought many hopes for solving of patient problems.

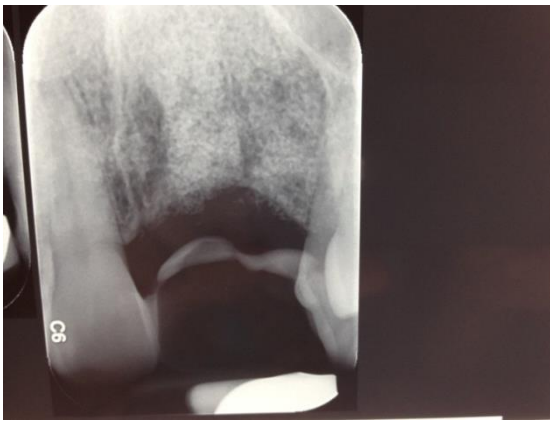

Figure 9. Radiography which highlights recovery of bone deficiency after extraction of 21 and 22

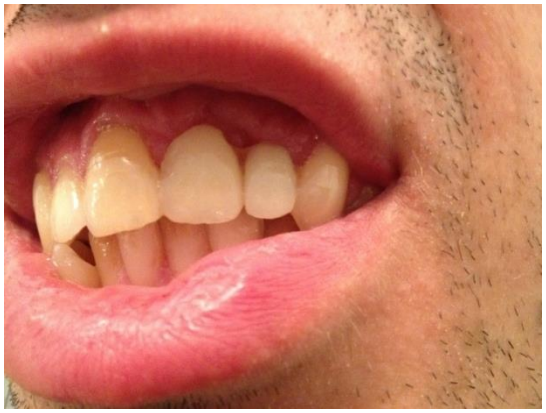

Figure 10. Temporary acrylic bridge for the restoration anatomy gum line.

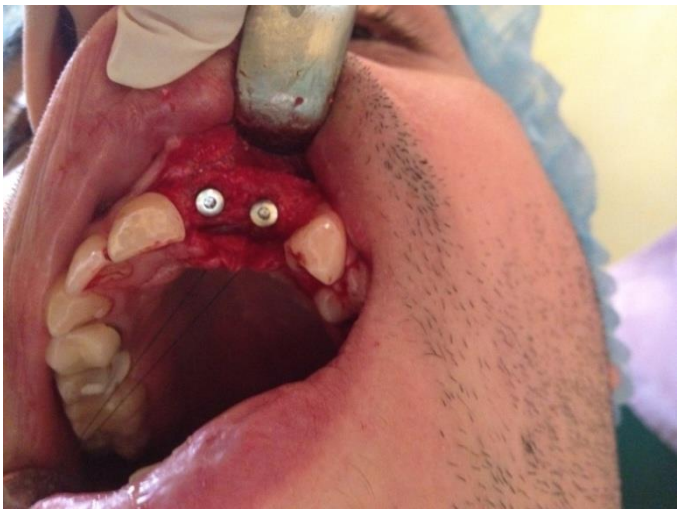

Figure 11. Cylinder-conical implant insertion

Periodontium is the best vascularized tissues of the oral cavity, thus possessing a wide range of regenerative abilities, which provide significant and rapid tissue recovery. Hard tissue or bone grafts (autologous, allogeneic, xenografts) and alloplastic

materials can be used in the treatment of periodontal defects and the initiation of regeneration of oral tissue complex (6, 12).
In the guided tissue regeneration is used a type barrier membrane in order to initiate selective repopulation of periodontal defect using cells derived from the periodontal ligament.

Nonresorbable membranes may expose tissues to infection and may require reintervention of their removal, while at absorbable membranes does not have this risk. The last have not its own support structure, so they are used typically associated with bone substitution membranes (12, 13).

The most used are membrane Cerabone and Jason-Botiss. Cerabone is a membrane of bone substitution material of bovine origin (spongy) whose internal structure is identical to that of human bone. It has excellent initial stability, and during osseointegration gets the same elasticity, strength and stability with the host bone, being indicated for the control of bleeding, functioning as a barrier, but also to protect the wound (14). Jason-Botiss membrane is an innovative membrane made of collagen extracted from the pericardium, which acts as a barrier for 3-4 months and can be used in dry or wet environments (15).

There are still challenges to overcome some obstacles raised by the application of modern techniques of treatment, but progress is provided and is expected in tissue engineering, gene therapy or stem cells would offer new revolutionary options to dental treatment in the immediate future.

CONCLUSIONS

1. Regenerative treatment options have multiplied in the past decade and brought many hopes for solving problems of patients.
2. Periodontium is the best vascularized tissues of the oral cavity, thus possessing a wide range of regenerative abilities, which provide significant and rapid tissue recovery.
3. Previous incorrect treatments, periodontal and bone defects have led to a complex approach of lesions, performed by multiple procedures of surgical order, restoration of tooth morphology and arches, balancing the occlusion, the more diversified as the disease has a more advanced evolutionary level.
4. The use of resorbable membranes Jason-Botiss and Cerabone in guided tissue regeneration initiates the selective repopulation of periodontal defects and bone substitution, making lateral and vertical bone augmentation. In addition, there is no risk of infection.
5. Marginal periodontium deficit was covered by a vestibular mucoperiostal flap fully reflected, later deperiosted in order to fully coverage of the bone addition, and on the palatal side by a pedicle flap of connective tissue graft rotated to facial side with which was reconstituted the gingiva deficit in height.
6. Implementation of modern options of regenerative treatment will become revolutionary in dentistry at the time when will ensure their availability, biocompatibility, longevity, and cost will be effective.

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THE USE OF ZX27 BIO-GLASS ABUTMENTS IN BITERMINAL EDENTATIONS TO SOLVE PROBLEMS OF MASTICATION AND PHYSIOGNOMY

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ABSTRACT

International experience shows that ZX-27 bio-glass pillar or abutment can handle more difficult cases, usually biterminal edentation when, for various reasons, skeletal and/or telescope prostheses or implants cannot be made and works very well. The authors present their experience in using this innovative material that adapts perfectly to each patient, while providing optimal functional and aesthetic results through a technique with reduced costs and execution time.

Key words: biterminal edentation, shortened dental arch, ZX-27 bio-glass abutment

INTRODUCTION

The support of extension dentures has long concerned dentists who have tried many materials, but these did not meet the requirements. The use of metals and plastics requiring processing by casting, maneuvers leading to problems of accuracy, so that the abutment could not rely precisely on the entire surface of the edentulous ridge and or did not meet the thermal expansion. Either ordinary glass or ceramic materials do not meet expectations (1, 2).

Glass pillar or abutment ZX2-7 is a progressive technique, an invention by Hungarian dental technician Laszlo Nemeth, being named after a new planetary system discovered recently that contradicts current astronomical laws as ought to disintegrate, but still there is. While the material used meets several conditions such as melting, processability, hardness, chemical resistance, but also high resistance to compression and shear forces during mastication (3, 4, 5).

The essence of ZX-27 Glass Abutment System is that those who still have own teeth, but do not want prosthetics or implants can obtain fix dentures with this method. Its use can solve difficult cases usually biterminal edentation when would be recommended skeletal and / or telescope prostheses or implants that the patient refuses them for various reasons (6, 3, 7, 8). The average life of the work is average of 7 years, after which it is necessary to remove it because the bone and alveolar crest withdraw and allow tilting of dental work, and mobilization of abutment teeth.

ZX-27 bio-glass abutment variant allows for optimal aesthetic and functional results with a low-cost technique. Execution time in the dental laboratory is much shorter than that required for implants or for achieving a

skeletal prosthesis (1).

ZX-27 glass abutments are made of special material (borosilicate glass) and adhere to the mucosa of the alveolar bone in the edentulous segments of the dental arches. The prosthetic abutment is thus replaced, meaning the own missing anchorage points. Dental technicians adapt perfectly on the patient's alveolar arch mucosa its own point of attachment made of glass ZX-27 (3, 9).

International experience over the years of several certified laboratories, a number of more than 15,000 satisfied patients and numerous clinical studies prove that ZX-27 glass abutment works very well (9, 10, 11).

MATERIAL AND METHODS

We present in detail the patient H.V. 50 years who presented to the dental office to solve the problems of chewing and physiognomy.

Clinical examination and evaluation of lesions were made after removing debris, dental plaque from the surface of lesions using a dental mirror and a probe. Marked abrasion of anterior and upper lateral teeth, Stillman's fissure in the central incisors, misfit filling on 23 and inappropriate endocanalar treatment were observed (fig. 1).

After analyzing the digital panoramic radiograph (fig. 2) it was concluded that this patient represents an ideal case for implant or even skeletal prosthesis.

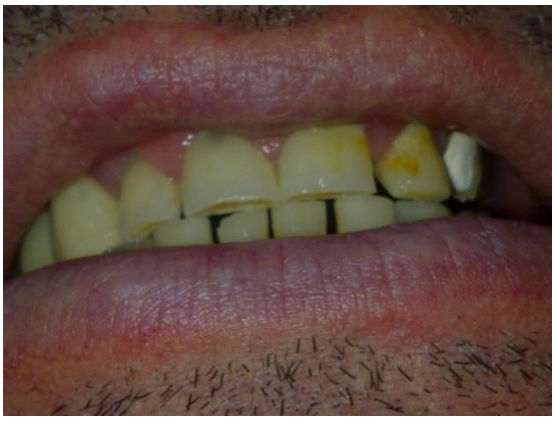

Figure 1. Patient H.V. Teeth appearance of patient at dental office presentation: marked abrasion of anterior and upper lateral teeth, Stillman's fissure can be observed in the central incisors, misfit filling on 23, inappropriate endocanalar treatment

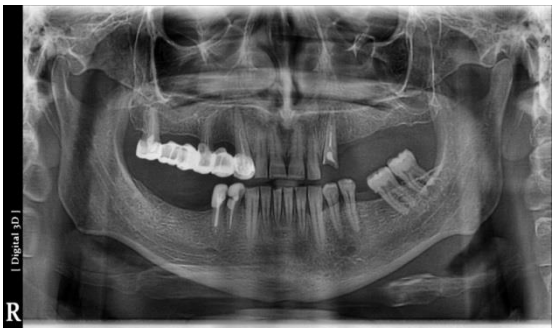

Figure 2. Digital orthopantomography of patient H.V. which highlights the overall situation of dentition.

It was decided the achievement of a fixed metal ceramic partial denture (fpd), total physiognomic from 12, 11, 21, 22, 23, xx (distal extension). Vital extirpation

And endocanalar fillings were performed on 12, 11, 21, 22 and recovery of treatment endocanalar at 23, the preparation of abutments, and the monoblock impression madeof two different materials: the one putty type and the second light body. The distal extensions were solved differently: the first was performed in semi contact saddle on the edentulous ridge and the second as device zx-27 (alternative to distal implant).

It was verified the status of the alveolar crest, which was well represented, of medium size, with sufficient alveolar height and width without bone resorption or sequelae after extraction. There were no oral mucosal diseases.

Another similar case was the patient t.v. of 42 years who presented to the cabinet for the recovery of masticatory and esthetic functions. The patient presents an unilateral terminal edentation. Since the patient did not accept acrylic or elastic partial removable denture or skeletal prosthesis, we agreed to accomplish a fixed partial metal ceramic denture which will be totally esthetic.

RESULTS AND DISCUSSIONS

Considering that the patient is relatively young and refuse classic-acrylic or elastic partial removable denture or skeletal prosthesis, we decided, by mutual agreement, to achieve a fixed partial denture which in distal extremities presents two extensions with a ZX-27 system carried out by technician in the laboratory. This system was chosen because the offer of edentulous ridge is generous being a ridge of average height and width and adapts closely to the muco-osseous support of edentulous ridge, better than semi contact saddle or tangential distal extension.

It began with endocanalar treatments of central and lateral teeth, (sanding) preparation of prosthetic abutments and monoblock impression made of two different materials, the one putty type and the second light body (Fig. 3).

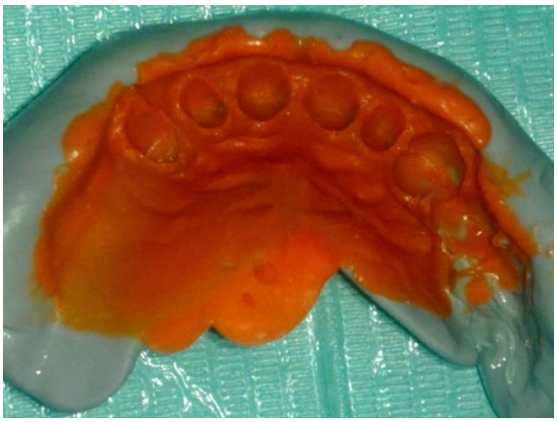

Figure 3. Patient H.V. Monoblock impression made of two different materials

Figure 4. Patient H.V. The metal skeleton, view from the cervical.

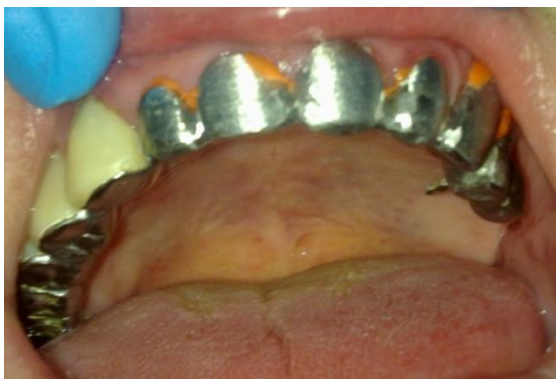

Figure 5. Patient H.V. Test with metal skeleton. It is noted the correct adaptation to the cervical line of teeth and good adaptation to the distal extensions

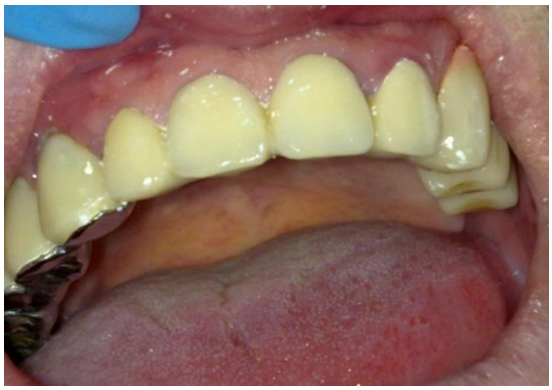

Figure 6. Patient H.V. Test with ceramic without coating. Occlusal adaptation, shape and color of teeth, marginal adaptation is analyzed.

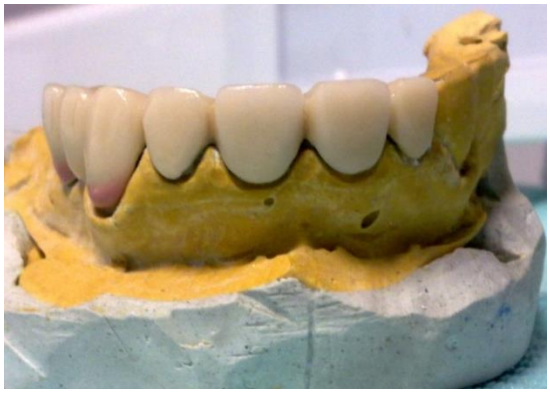

Figure 7. Patient H.V. Fixed partial denture on the model. It can be noticed the makeup with fake gum at level of 23 and 25

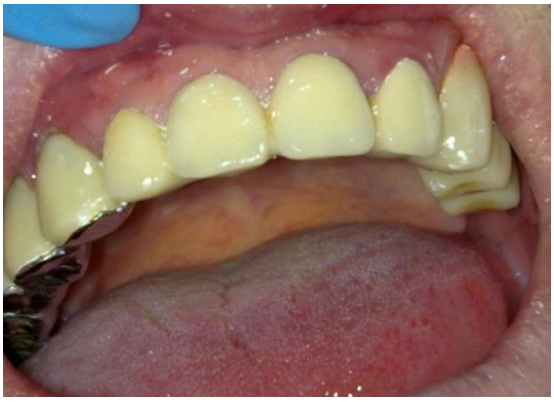

Figure 8. Patient H.V. Fixed partial denture, front view norm. The aim is to adapt to the cervical line and mucosal level.

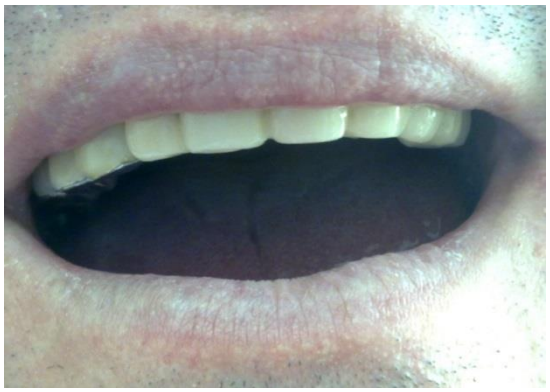

Figure 9. The final aspect of fixed partial denture in the patient H.V.

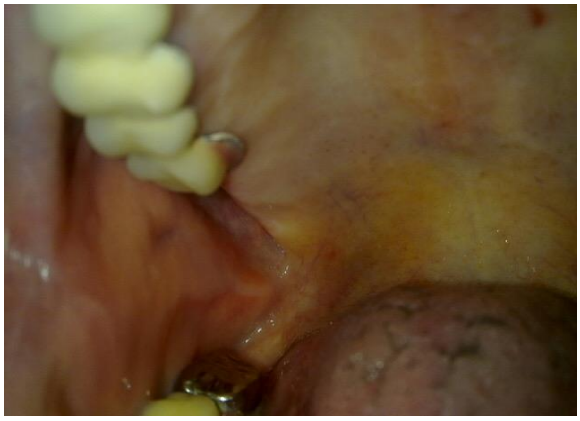

Figure 10. The final aspect of the prosthetic work, palatal view, on which can be observed 16 extension that dress the crest on palatal slope.

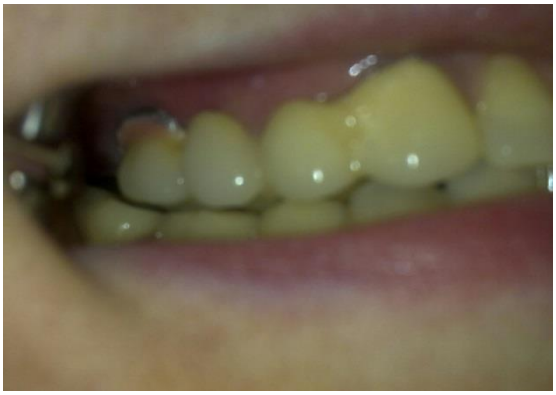

Fig. 11. T.V. patient 42 years. The final aspect of fixed partial denture, facial view. It can be seen at the aspect of 16 extension that dress the crest on vestibular slope.

The patient T.V. 42 years presents an unilateral terminal edentation on which we developed a fixed metal ceramic partial denture which will be totally physiognomic.

Two totally esthetic crowns were made on 23 and 24, abutment teeth being 13 and 14,

the two distal extensions placed at 15 and 16, the last in ogival shape dress up the crest on vestibular and palatal side on 2-3 mm.

The presented cases demonstrate that the technique using the pillar ZX-27 can be applied successfully in case of shortened alveolar arches at one or both ends, whilst supporting fixed prostheses and avoiding the problem of a separating large bridge. The decision to run a bridge with extension depends primarily on the morphology and physiology of the existing prosthetic field, but also on oral and general factors that are specific to each patient, such as age, physiological and pathological general states, the moment of edentation

and its complications (3, 2).

The pillar ZX-27 is recommended to be used in patients who are afraid of implant or do not want to wear a skeletal or telescope prosthesis or just cannot afford such a work. This is achieved with modest cost and execution time which do not differ from that of a normal fixed work (12, 3).

It is 100% biocompatible because it does not contain lead as normal glass, but borosilicate (13), being accepted without any problems by the soft gingival tissues (14). In addition, it is personalized for each patient, it can be easily sanitized and does not create discomfort, and the patient is immediately accustomed with the prosthetic works.

CONCLUSIONS

1. The proper use of the prosthesis by abutment or pillar ZX-27 has allowed the realization of a prosthetic works that provides not only the fulfilling of masticatory function, but also satisfies the aesthetic requirements of the patient.
2. Fixed partial dentures of this kind are light constructions that are accepted in a shorter period of time by the patient and successfully replace a skeletal prosthesis with or without special systems, an acrylic or elastic removable partial denture, which are heavy prosthesis with long periods of adaptation.
3. The technique applies only in conditions of a pronounced and firm alveolar crest at the place of anchorage points of ZX-27 glass in order to restore occlusal relations and functions of the prosthesis.
4. The point of fixation of glass pillar ZX-27 is the most distal part of the bridge with shortened dental arch after the preparation of two teeth and mounting of two extensions.
5. Patient is advised to maintain oral and dental hygiene, but also to ensure protection of prosthesis.
6. The prosthetic work control is required every 6 months after prosthesis cementation and completion of a panoramic radiograph at one year.

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OBJECTIVE TESTS FOR THE EVALUATION OF COCHLEAR IMPLANT CANDIDATES

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ABSTRACT

Introduction: Cochlear implant indications have changed during the last decade. The objective tests are important in the cochlear implantation procedure. **Purpose of the study:** We proposed an evaluation for the objective tests in establishing a corect indication for cochlear implant in patients with bilateral sensorineural deafness. **Materials and methods:** We studied a group of 34 patients with bilateral sensorineural hearing loss tested by subjective and objective methods for an eventual cochlear implantation. **Results:** 74% of the patients presented a profound bilateral sensorineural hearing loss, 15% a severe type, 4% medium, 3% fluctuant and 4% cofosis. The examined patients fulfill the auditory criteria that justify the cochlear implant procedure. **Discussions:** The evaluation by subjective tests is followed by objective tests, offering provative evidence in clear cases and also in unclear ones. As a supplimentary measure, all the patients evaluated by subjective tests in establishing the possibility for cochlear implantations received at least one objective form of testing. **Conclusions:** Currently, the objective tests represent an important step in the reccomandation for cochlear implant. In all cases (excepting young children) the objective tests are compared/correlated with the subjective tests before the implantation procedure, specially with the subjective evaluation by a conventional prosthesis.

Key words: bilateral sensorineural hearing loss, cochlear implant, subjective tests, objective tests

INTRODUCTION

The cochlear implantation is the procedure by which the patients with profound deafness or with cofosis can benefit of the re-establishment of the auditory function. Cochlear implant indications have changed during the last decade by a greater area of indications due to the new knowledge regarding the hypoacusis and to the perfection of the implant itself and of the surgical procedures [1].

Besides subjective tests, the objective tests are important in the cochlear implantation procedure, essential for canditates with the age between 0 and 5 years old and also for the objectivity of the implant indication in borderline situations or special pathologies [2,3,4].

The objective test cad also provide indications for the auditory-verbal and behavioural future of the implanted patient, with the purpose of a proper social insertion [5].

PURPOSE OF THE STUDY

We proposed an evaluation of the objective tests in establishing a correct indication for cochlear implant in patients with bilateral sensorineural deafness in a group of 34 patients in the ent clinic, clinical recovery hospital iaşi, in the period 2012-2013.

MATERIAL AND METHODS

We studied 34 patients with bilateral sensorineural hypoacusis tested by subjective and objective measures with the purpose of an eventual cochlear implantation.

We used the following examination procedures:

- Subjective methods: pure-tone audiometry (PTA), vocal audiometry (VA), tone and vocal audiometry in free field with and without auditory prosthesis
- Objective methods: tympanometry, stapedial reflex (SR), brain-stem auditory evoked potentials (BAEPs), auditory steady state response (ASSR), evoked otoacoustic emissions (OAE), electrocochleography (ECochG).

All the patients included in this study received at least one objective test during the audiometry evaluation in establishing the indication for cochlear implant procedure.

RESULTS

In the study group 34 patients presented bilateral sensorineural hypoacusis tested by subjective and objective methods, 16 females (47%) and 18 males (53%).

We assessed 13 children with the age 0-5 years old (38%), 14 with the age between 5 an 18 years old (41%) and 7 adult patients (21%) (Fig.1).

The audiometry revealed the following data: 74% of the patients presented a profound bilateral sensorineural hearing loss, 15% a severe type, 4% medium, 3% fluctuant and 4% cofosis (Fig.2).

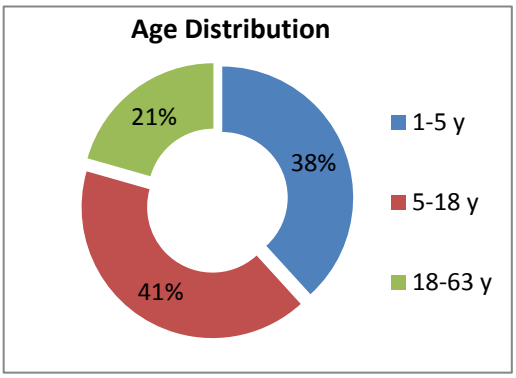

Figure 1. Age distribution for the 34 patients investigated for cochlear implantation

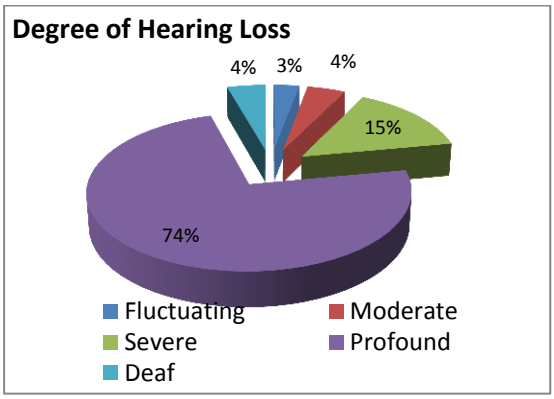

Figure 2. Degree of hearing loss in the 34 patients investigated.

In the age group of 0-5 years old we diagnosticated 10 patients with profound sensorineural hypoacusis, 1 patient with severe bilateral sensorineural hypoacusis and 2 patients with bilateral sensorineural hypoacusis, with a severe form on one ear and profound on the other ear.

In the age group of 5-18 years old we diagnosticated 8 patients with profound sensorineural hypoacusis on both ears, 1 patient with moderate form, 1 patient with severe form, 1 patient with bilateral fluctuant form and 3 patients with different degrees of sensorineural hypoacusis on each ear (moderate/profound, severe/profound, severe/cofosis).

In the adult patients group (>18 years old), the majority (5 patients) presented bilateral profound sensorineural hypoacusis (71%), 1 patient – the severe form and 1 patient with cofosis.

After the conducted examinations we can

observe that patients fulfil the auditory criteria that justify the cochlear implant procedure.

DISCUSSIONS

In the age groups after 5 years old (children, teenagers, adults), the implant indication can be supported only by subjective tests; in this category we can include bilateral sensorineural hypoacusis on 3 frequencies on PTA and VA and free field tone audiometry [6]. 21 patients were included in this group.

A lack of correlation was observed in the case of patient DO, 63 years old, between the PTA thresholds (severe bilateral sensorineural hypoacusis), free field tone audiometry with auditory prosthesis (medium threshold of 40dB) and free field vocal audiometry with auditory prosthesis which did not offer any answer (0%).

We must mention the fact that until now there is no objective method to assess the free field vocal auditory ability with prosthesis. In this case the objective tests with BAEPs were a neccessity. We could not obtain a V-amp on BAEPs, therefore a retro-cochlear lesion could be possible, probably due to a neural dyssynchrony.

In another case the objective methods were necessary to establish a proper indication for cochlear implant; it was the case of a 6 years old child (CF), with different thresholds on different times in PTA. The ASSR and BAEPs tests offered an objective diagnostic of fluctuant bilateral sensorineural hypoacusis and, according to these tests, we could include the patient in the cochlear implant candidates group.

The evaluation by subjective tests is followed by objective tests, offering probative evidence in clear cases and also in unclear ones.

As a supplementary measure, all the patients evaluated by subjective tests in establishing the possibility for cochlear implantations received at least one objective form of testing.

In the case of unrespondent patients to the subjective tests or in case of doubt we use the following objective methods: time, ASSR, BAEP, SR, ECochG, OAE [7].

In the case of child patients (less than 5 years old) the implant indication assessment is based on objective tests [8, 9]. The physiological methods include tests to obtain an answer to the auditory stimuli independently on the patient's will [10, 11].

The objective methods address to the phsysiological mechanisms of the middle and inner ear (tympanometry, otoacoustic emissions), to neurophysiologic processes of the auditory pathways (electrophysiological methods) or to motor and neurovegetative reflexes provoqued by auditory stimuli (reflex methods) [10, 12]. In this category we can include: standard tympanometry, SR test, measurement of the OAE, of the BAEP and the evaluation of motor and neurovegetative reflexes.

Tympanometry represents the measurement of the middle ear system compliance, in conditions of air pressure changes in the external auditory conduct [10]. It is useful for:

- Detecting any change of the tympane-bone transmission system
- Hypoacusis screening on newborns
- Examination of mentally or cognitive impaired persons and of the stimuli
- Evaluation of the Eustachian tube
- Diagnosis of the glomus jugulare or glomus caroticum.

In case of sensorineural hypoacusis the tympanometry is used for the exclusion of an associated pathology of the middle ear.

Stapedial reflex represents the reflex contraction of the stapedial muscle on acoustic stimuli higher than a certain threshold (on human: 75-80dB); this

contraction determines a tightening of the bone chain and a change of impedance of this system [12]. In clinical practice it is used for:

- Differential diagnosis between transmission and sensorineural hypoacusis
- Differential diagnosis of closed tympane transmission hypoacusis
- Facial paralysis topographic diagnosis (supra or substapedial) [10]
- Hearing objective assessment on patients without the capacity of supporting behavioural tests (small children, psychically challenged persons, stimuli)
- Central lesions diagnosis with a cessed controlateral acoustic reflex arch on brain stem level.

The evoked auditory potentials are electrophysiological methods that allow the hearing testing by registering the nervous evoked auditory potentials of the auditory nerve, brain stem or cerebral cortex.

The quality and the form of the evoked auditory potentials depend on their latency (the time passing since the stimulation until their appearance). Based on the latency we can describe:

Electrocochleography – the registration of cochlear and auditory nerve potentials, in a time of 1-10ms since the stimulation [13]; the transtympanic electrode is placed on the external wall of the cochlea (promontorium).

Brain-stem auditory evoked potentials (BAEPs) – they register the electrical activity in the cochlear nerve and in various areas of the brain stem, in a window of 1-10ms post-stimulation [14].

The electrodes are placed on the skin surface, the electrical response is complex and reflect the activity from: cochlear nerve, bulbar cochlear nuclei, superior olivary complex and the lateral lemniscus [14]. They are presented as 5 amp, from I to IV, with different amplitudes and latencies (Fig.3).

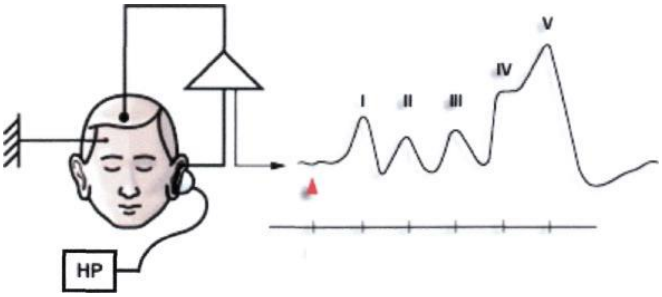

Figure 3. The registration of brain-stem auditory evoked potentials on human subject. The I-IV amps and their latencies are presented

Brain-stem auditory evoked potentials present a series of clinical applications:

- retrocochlear pathology diagnosis – baeps do not require any supplimentary supraliminary tests or ecochg;
- auditory screening on newborns – it is one of the main screening tests.
- objective estimation of the auditory threshold on difficult patients (small children, psychically challenged persons, stimuli);
- intraoperative monitoring of the auditory nerve; differential diagnosis between transmission and sensorineural hypoacusis (cochlear and retrocochlear).

Although they are capable of hypoacusis detection, they can not determine the cause of such hypoacusis; this method offers information regarding the existence and the localisation of a lesion in a certain segment of the auditory pathway [15].

Baeps are not capable of offering information regarding the superior auditory structures of the brain stem or the hypoacusis

determined by lesions on these levels.

Medium or late latency auditory evoked potentials intervene in such cases.

Medium or late latency auditory evoked potentials are rarely used in the clinical practice, mainly for the assessment of the auditory acuity on low frequencies in children and uncooperant persons. Late latency auditory evoked potentials offer information on the primary and secondary auditory cortex areas, being extremely useful in determining of the tone threshold in non-organic hypoacusis evaluation in adults.

They are very sensitive in the vigil/sleep status and in anaesthesia, therefore they are very limited in testing the uncooperative patients (children, psychically impaired persons).

Otoacoustic emissions (OAE)

The otoacoustic emissions are acoustic signals produced by the cochlea, propagating backwards, through the middle ear, in the external auditory conduct where they can be registered with small microphones [16,17].

The contractile activity of the external ciliated cells represents the mechanical source for the energy of the cochlear amplifier [18]. The otoacoustic emissions are a secondary product of the amplified wave; they are retrogradelly transmitted in the cochlea to the stapes and then through the middle ear to the external auditory conduct, where they are registered.

OAE can appear spontaneously or after the auditory stimulation of the ear (evoked oae), implying an intact cochlea and normal outer and middle ear.

Spontaneous OAE appear in the absence of acoustic stimulations, in a limited number of normal hearing ears. They do not have a clinical significance. Evoked oae are currently used in clinical practice to diagnose the cochlea status.

In st patient, 3 years old, we observed the lack of correlation between the thresholds obtained on assr testing (severe bilateral sensorineural hypoacusis on one ear and profound on the other) and the absence of any response on baeps, situation in which the objective tests suggest an auditory neuropathy. In this case of lack of correlation between the two tests, it might be the case of an unfavourable prognosis for the auditory-verbal rehabilitation of the patient because the patients with auditory neuropathy do not obtain the same results on verbal evaluation after the cochlear implantation.

CONCLUSIONS

Currently, the objective tests represent an important step in the recommendation for cochlear implant. The obtained data can represent prognosis factors of the evolution after the implant procedure for auditory-verbal rehabilitation on children and for the vocal understanding on adult patients.

In all cases (excepting young children) the objective tests are compared/correlated with the subjective tests before the implantation procedure, especially with the subjective evaluation by a conventional prosthesis.

The objective tests used can be useful also after the implant procedure in the assessment of the electroneural system.

There are not any objective methods to assess the auditory performance with conventional prosthesis (verbal discriminatory tests); the testing can be conducted only by subjective methods.

The comparation between objective and subjective tests (where it is possible) offers information regarding the performance after the cochlear implant procedure (e.g. auditory neuropathy – a poor acquisition of the language).

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AN "IN VITRO" STUDY ON THE CANAL SHAPING CAPACITY OF PRO TAPER FILES

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ABSTRACT

The aim of this study was to examine the risk of stripping perforation of the root canal while shaping with Pro Taper manual system. Resin blocks were instrumented with manual Pro Taper files then photographed. The pictures were entered into a computer program to perform measurements. At 8 mm from the apex, all ProTaper files led to a significant transportation of the inner wall of the curvature compared to the control ($p < 0.05$). At 5 mm, ProTaper files ranging from S2 to F3 presented important statistical differences compared to the control. Also, file F3 achieved a transportation of 1.89 of the inner wall compared to file S1. At 2mm, the finishing files F2, F3 incurred significant increases of the total diameter ($p<0.05$) in contrast with both the control and files S1 and S2. ProTaper system removes a large amount of root dentin increasing the risk of stripping perforation.

Key words: stripping perforation, ProTaper shaping files, ProTaper finishing files

INTRODUCTION

Over the time, there have been published numerous studies on the various types of endodontic instrumentation and movements that should be performed during canal enlargement. There was examined the quality of the mechanical treatment through different techniques and there have been established stages to be followed to obtain a better result (1-12).

The introduction of Ni-Ti alloy in endodontics became an intensely used alternative to stainless steel instrumentations (1).

The flexibility and torsional fracture resistance of Ni-Ti alloy improved design features of endodontic instrumentation leading to a decrease of procedural failures. In that respect, it was possible to preserve the root canal anatomy (2). Ni-Ti alloy allowed the taper increase of the endodontic files in order to create an adequate root canal shape. However, this led to an increasing loss of dentine volume during the root canal shaping and even to stripping perforations (8).

Recently, in endodontic practice, there was introduced a large number of NiTi rotary systems intended to prevent the numerous accidents that might appear during endodontic treatment. The perforation by stripping can occur after an excessive enlargement of the canal correlated with the use of inappropriate instruments such as files with insufficient flexibility. A stiff root canal file can not maintain the canal curve. On the other hand, an increased taper is an additional

reason for stripping in some root areas with thin walls.

Depending on their design, among the Ni-Ti rotary systems there are differences in their performance concerning the ability to preserve the canal geometry (11). Therefore, in curved canals, it is recommended to use jointly two files systems, either manual in combination with rotary or two rotary systems, one with an increased taper and the second with a decreased taper (maximum 0.04) in order to enlarge the apical area without increasing the risk of stripping in the coronal region (eg. ProTaper with LightSpeed or ProTaper with PathFiles) (10).

ProTaper system (Dentsply / Maillefer, Ballaigues, Switzerland) was produced in two versions: manual and rotary with progressive taper, to create an ideal shape of the canal and reduce the shaping time (6). The recommended technique for this system is crown-down and brushing movements are predominant.

Numerous studies compared ProTaper rotary system to other systems to examine the ability to maintain the proper shape of the canal and to decrease the time required performing endodontic treatment, but studies within the system were quite infrequent (12).

The present study intends to examine the dimensional change of the root canal during its shaping with Pro Taper manual system related to the risk of perforation by stripping.

MATERIAL AND METHODS

Within this study there have been introduced a number of 25 resin blocks having inside a curved canal made after a standard model in all the selected endodontic blocks. The blocks have been instrumented with manual Pro Taper as described in the prospectus regarding the sequence, the recommended movements and the use rules. In order to capture the moment when errors occur within the canal instrumentation technique it was used one block for each sequence of files meaning one block for S1, another block for file S2 that was previously instrumented with S1, another block for file F1 that was previously enlarged with files S1 and S2, and so on. Thus, there is a total of five acrylic blocks instrumented in a complete sequence of files ranging from S1 to F3. Five files were kept without being instrumented to be used as controls.

The instrumented blocks were positioned on a measuring ruler and then photographed through a stereomicroscope, the same way as the five sample blocks. The pictures were entered into a computer program (Allplan software) to perform, based on preset levels, the desired measurements: the angle and the radius of the canal curvature resulted after instrumentation with each file, the diameter of each canal after each file at 2, 5 and 8 mm from the apex and the transportation distance of the curvature inner wall at 5 and 8 mm from the apex [Figure 1-6]. Diameters were measured in 10 millimetres units.

Data were expressed as mean values, standard deviations and ranges. Analysis of variance was used to test for significant differences between means, and the Bonferroni test analysed the effects through multiple comparisons. StataIC 11 statistical software (StataCorp LP, College Station, TX, USA, version 2009) was used for data analysis. A p-value < 0.05 was considered statistically significant.

RESULTS

The resin blocks that were not instrumented had a curvature angle of 32.89 degrees and a radius of 108.47; an internal and an external diameter at 8 mm from the apex of 2.67, the total diameter being twice larger; an internal and an external diameter at 5mm from the apex of 2.13 and a diameter at 2 mm from the apex of 3.3.

At 8 mm from the apex all ProTaper files

starting with S1 up to F3 led to a significant transportation of the inner wall of the curvature compared to the control ($p < 0.05$) [Figure 1-6].

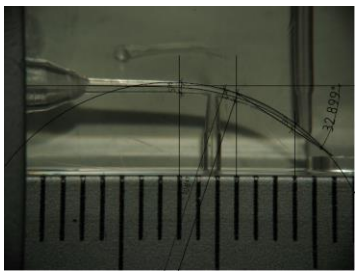

Figure 1 Control sample

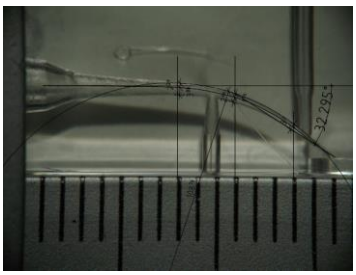

Figure 2 Diameters after instrumentation with S1

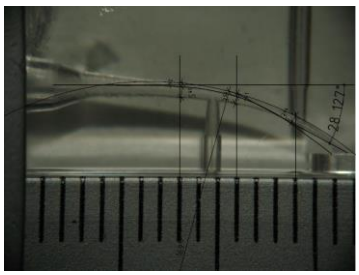

Figure 3 Diameters after instrumentation with S2

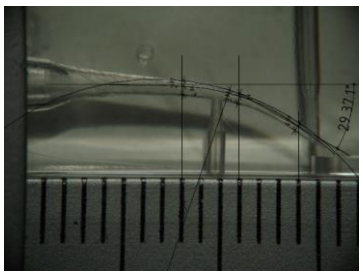

Figure 4 Diameters after instrumentation with F1

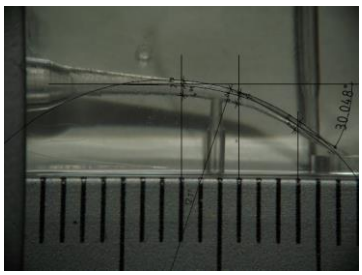

Figure 5 Diameters after instrumentation with F2

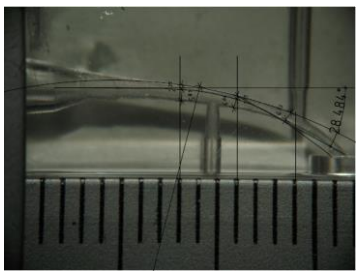

Figure 6 Diameters after instrumentation with F3

Regarding the total diameter of the canal at 8 mm from the apex, when instrumented with file f3, it increased significantly both when compared with the total diameters of the canals instrumented with the other files and when compared with the total diameter of the control ($p<0.05$).

At 8 mm from the apex, file f2 led to a 0.69 increase of the total diameter compared to the control and to a probabilistic value of 0.003.

At 5 mm from the apex, protaper files ranging from s2 to f3 presented important statistical differences compared to the control related to the internal diameter of the canal. The probabilistic value varied inversely proportional with the diameter of the file and was lower than 0.05.

At this level, file s1 did not perform a significant transportation of the inner wall compared to the sample ($p=0.199$), whereas file f3 achieved a transportation of 1.89 of the inner wall compared to file s1, leading to a significant statistical difference when compared to the latter ($p =0.038$).

The total diameter of the canal increased significantly compared to the sample starting with file s2, from the value of 4.26 of the sample reaching an average of 6.51 for file f2 and 7.22 for file f3. The finishing file f3 achieved a significantly higher enlargement compared to files s1, s2 and f1 too, unlike file f2 that incurred a probabilistic value lower than 0.05 only when opposed to file s1.

At 2mm from the apex, the finishing files f2, f3 incurred significant increases of the total diameter ($p<0.05$) in contrast with both the control and files s1 and s2. At this level, file f1 led to a diameter increase of 1.29 compared to the sample and a probabilistic value of 0.001.

In terms of angle and radius of the canal curvature there were not significant differences compared to the control sample or

during instrumentation with protaper files system ($p>0.05$).

DISCUSSIONS

The root canal shaping should be done so as to allow its cleaning and disinfection but it should also preserve the root anatomy in order to avoid an excessive preparation that could lead to accidents such as perforation by stripping and thus to a decreasing fracture resistance.

The perforation by stripping can occur in the coronal and middle third of the canal, and may have consequences for the apical region, thus one shall take into account the results achieved following instrumentation at 8 mm, 5 mm and 2 mm from the apex.

This study noticed that at 8 mm from the apex there is a significant transportation of the inner wall of the canal curvature. The risk of perforation appeared yet since file S1 and increased once finishing files F2 and F3 were used.

In a study conducted by Uzun et al. (5) it was shown that rotary ProTaper system removed the biggest quantity of dentine from the inner side of the canal curvature, in the risk zone, as opposed to other rotary systems. This is also supported by other studies such as the one conducted by Calberson et al. (3) on the enlargement capacity of the ProTaper instruments where he cautioned over the use of F2 and F3 instruments in curved canals because of their stiffness. Instead, in his study, Mahran et al. (8) concluded that ProTaper is a system that provides secure coronal pre-enlargement in curved canals, removing a small amount of dentine from the risk area and therefore reducing the incidence of perforations by stripping.

However, the amount of dentine removed from the canal walls following Ni-Ti rotary instrumentation is quite high, leading to a low resistance of the tooth (8). In the present study, one can notice that manual ProTaper system performs a significant enlargement both at 8 and 5 mm from the apex resulting in thinner canal walls, thus decreasing the resistance of the tooth. In a study by Sanfelice et al. (9) it is shown that in case of the relatively stiff Gates Gliden drills, the stripping risk is greater as compared to ProTaper files. In contrast, Zhang et al (7) reported that ProTaper files S1 and S2 with an increasing taper and over-elasticity achieved a safe enlargement in the cervical area of the canal and without apical transportation risk. This can be seen in our study only in file S1 at 5 mm from the apex. At 8 mm, this file presents a risk of perforation due to the progressive and increasing tapering of the file.

Our study also showed that finishing files F1, F2 and F3 produced a significantly greater enlargement at 2 mm from the apex compared to the control sample.

Thus, in order to minimize the risk of apex transportation in curved canals, when shaping with finishing ProTaper F files, it is not recommended to insist when the working length is reached (6). For apical enlargement, it is recommended to use finishing ProTaper F files together with a system of Ni-Ti flexible files without taper (10).

The straightening tendency of the canal increases the stripping risk. This may be due to the variable and increasing taper of ProTaper system, which is what gives it a lower flexibility than other Ni-Ti systems (12). However, this study shows that in terms of canal shape, Pro-Taper system makes no significant changes in angle and radius of the curvature even in files with a larger diameter (F2 or F3).

CONCLUSIONS

Due to its design, ProTaper system removes a large amount of root dentine in the cervical third of the root canal increasing the risk of stripping perforation.

In the curve middle third, file S1 makes no significant change to the inner wall. Instead, files F2 and F3 significantly reduce the thickness of root canal walls at all three levels (cervical, middle and apical).

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THE EVALUATION OF THE INTERRELATION BETWEEN CHRONIC PERIODONTITIS AND CHRONIC RENAL DISEASE BY QUANTIFYING THE GLOMERULAR FILTRATION RATE MARKERS

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ABSTRACT

Introduction: The latest specialty studies have demonstrated a new role of the periodontal disease in the etiopathogeny of the systemic diseases. Acute and chronic systemic infections can promote an inflammatory renal response (glomerulonephritis). **Purpose of the study:** The present study proposes a research of the periodontal status influence on chronic renal dysfunctions, in order to eliminate a co-factor which might affect the systemic conditions. **Materials and methods:** Sixty patients with incipient chronic renal disease were included in this study; they were divided in two groups (30 patients with periodontal disease and 30 patients without periodontal disease). We measured serum and urinary levels of renal function markers (urea, creatinine, albumin); glomerular filtration rate was estimated from the creatinine clearance and the changes of the albumin (mg)/creatinine (g) ratio were evaluated in the 24 hours urine sample. **Results:** A great number of sites with probing depth between 3 and 5mm was correlated to higher creatinine elimination rates. A high number of sites with probing depth<3mm and low bleeding on probing was associated with higher levels for creatinine, creatinine clearance and low levels of serum albumin. **Conclusions:** The periodontitis patients presented modifications for serum or urinary markers of renal dysfunctions, suggesting that periodontitis and periodontal treatment might influence the renal function in certain conditions.

Key words: chronic renal disease, periodontal disease, biochemical markers

INTRODUCTION

Chronic periodontitis, the most common periodontal disease, is defined by the American Association of Periodontology as an infectious disease, with periodontal inflammation, progressive attachment loss and bone loss. This process leads to the periodontal pocket formation and/or gingival recessions. This definition is based on an infection model and on the host response, still insufficiently known to determine a diagnosis, leading to a complete classification based on the disease etiology [1].

There is evidence supporting the contribution of the periodontitis to chronic systemic disease. Therefore, some results showed an association between periodontitis and atherosclerosis. This connection is explained by the circulation of the periodontal pathogens in the blood torrent, promoting the damage to the blood vessels endothelium and atherosclerosis. A bidirectional character of the relations between systemic inflammations and local, periodontal inflammations was

demonstrated [2]. Various acute and chronic infections are able to determine a renal inflammatory response (glomerulonephritis). The renal disease prevalence is higher and higher and most patients with renal diseases also present periodontal diseases, making this aspect very relevant [1, 3, 4].

THE PURPOSE OF THE STUDY

The present study proposes a research of the periodontal status influence on chronic renal dysfunctions, in order to eliminate a co-factor which might affect the systemic conditions.

MATERIAL AND METHODS

Patient selection

This study was conducted in the Specialty Ambulatory of the "Saint Andrew" Emergency Hospital, Galaţi, Clinic of Nephrology, in collaboration with the Periodontology Clinic of Dental Medicine Faculty, "Gr.T.Popa" University of Medicine and Pharmacy, Iași, from November 2011 until July 2012.

We assessed 60 patients with incipient chronic renal disease, with the age between 32 and 58 years old, divided in two groups, each one of 30 patients:

- The study group: 30 patients with chronic periodontitis and incipient chronic renal disease (with more than 14 teeth, 3rd molar included), 4 of them with a least one periodontal probing depth (PPD) of 3-5 mm and 4 with at least one PPD of 6-10 mm.
- The control group: 30 volunteers, periodontally healthy, with incipient chronic renal disease (with more than 14 teeth, 3rd molar included), with bleeding on probing (BOP)<30% of periodontal sites with PPD 1-3 mm, 2 isolated sites with PPD of 4 mm and without BOP and attachment loss (AL) of 3 or more mm of <30% of all the sites.

The exclusion criteria: unfavorable systemic conditions (rheumatic fever, heart conditions which require antibioprophylaxis), pregnancy, women with hormonal replacement therapy or birth control pills, patients with NSAIDs or SAIDs (in the last 3 months) or antibiotics (in the last 6 months), smoking, subjects with high sensibility to C-reactive protein higher than 10mg/L.

All the subjects were instructed regarding the oral hygiene methods and followed preventive or curative oral treatment.

Periodontal assessment

The periodontal probing was conducted on six sites per tooth (mesial-facial, facial, distal-facial, mesial-oral, oral, distal-oral), before and after the periodontal etiologic treatment.

We evaluated the following periodontal parameters: periodontal probing depth (PPD), the attachment loss (AL), bleeding on probing (BOP), plaque index (PI). The severity of these indices was established according to current studies (AL>2 mm, PPD>2 mm). The disease severity was determined according to the pathological sites proportions (for AL and PPD).

Paraclinical evaluation – laboratory tests

We collected venous blood samples (8 ml in vacuumed tubes) from patients, with a fast for 12 hours (during the night). The 24 hours urine sample was completed in the same morning as blood sampling.

We measured serum and urinary levels of renal function markers (urea, creatinine, albumin); glomerular filtration rate was estimated from the creatinine elimination and the changes of the albumin (mg)/creatinine (g) ration in the 24 hours urine sample.

Serum and urinary urea was determined by measuring the UV absorption of NADH consummated in the presence of glutamate dehydrogenase.

The creatinine was analyzed by Mustosa-Basques colorimetry, based on complex absorbance and colorants formed by picrate

with creatinine and with interference compounds, on alkaline pH; when the acetic acid is added, picrate cratinine complex is destroyed and the difference between the two absorbents is proportional to the creatinine quantity.

The urate oxidase test was conducted to measure the ureic acid; the ureic acid is the first one to be oxidized and the oxygen is transformed in hydrogen peroxide, determined by the reaction between peroxidase and a chromogenic substance.

The serum albumin was determined with the bromcresole green assay, which forms a complex with the albumin, absorbing a certain wavelength in the visible spectrum. The albuminuria was quantitatively assessed by electrophoresis – a method which appreciates the presence/absence of protein fractions or specific proteins.

The serum and urine samples were assessed immediately after their collection.

The biochemical analysis was conducted after the initial periodontal treatment.

The statistical analysis

Chi-square test was used to determine the group intervals for a certain variable, according to the patient frequency on each category.

The t-Student test was used to compare the quantitative variables inside the groups, associated with Mann-Whitney test, with a level of significance P<.05.

The data for the control and study groups were analyzed with the canonic multivariate correlation analysis, using the SAS software, in order to evaluate the correlations between their canonic variables for the periodontal diagnosis and renal function markers variables.

RESULTS

The sex distributions for the control and study group were similar: 13 males and 17 females in the control group, 16 males and 14 females in the study group; there was no significant age difference (mean value of 43±5 years old and 46±6 years old, respectively).

The Table 1 shows the mean values and differences between PPD, AL, BOP and PI.

Table 1. Periodontal variables

	Control group		Test group		
Variables	Mean ± SD	Gamma median	Mean ± SD	Gamma median	
Teeth number	28,0±3,0	28,0 (22,0-32,0)	25,0±4,0	26,0 (14,0-32,0)	*
PPD* (sites %)					
< 3mm	92,8±5,7	95,0 (79,0-99,4)	46,9±16,1	47,2 (17,5-74,0)	*
3-5mm	72±5,7	5,1 (0,6-21,0)	42,8±14,6	44,9 (19,0-76,3)	*
≥ 6mm	0±0	0 (0-0)	9,8±6,5	9,4 (2,3-28,4)	*
Extesion[b] (%)		5,23 (0,60-20,97)		52,82 (26,0-82,5)	†
Severity[c] (mm)		1,00 (1,0-1,40		2,25 (1,39-3,62)	†
AL[d] (sites %)					
< 3mm	89,9±7,0	92,4 (92,0-98,6)	35,1±15,1	37,6 (0,6-57,1)	*
3-5mm	9,0±7,0	7,0 (1,0-28,0)	46,0±11,0	46,0 (20,0-65,0)	*
≥ 6mm	0±0	0 (0-2,0)	17,0±12,0	13,0 (3,0-50,0)	*
Extension[b] (%)		7,63 (1,28-28,0)		62,44 (42,86-99,38)	†
Severity[c] (mm)		1,00 91,00-2,27)		2,58 (1,45-4,50)	†
BOP (sites %)	6,0±6,0	4,0 (0-20,0)	51,0±30,0	43,0 (9,0-100,0)	*
PI (sites %)	16,0±7,0	16,0 (0-33,0)	68,0±34,0	64,0 (0-100,0)	*

*the higher the PPD, the higher the risk for periodontitis and inflammation is, specially if bleeding appears
[b]% among the affected sites
[c]% the attachment and bone loss, higher than 2 mm
[d] the best indicator for bone loss determined by periodontitis
The significance level: * p=0.006, † p=0.001

PPD and AL values were classified as follows: <3 mm (incipient), 3-5 mm (moderate), >6 mm (severe); the differences between the groups were significant – only the test group presented deep periodontal pockets. The number of teeth and the superficial periodontal pockets proportion were higher for the control group; the test group presented higher variables (p=0.006). The mean values of PPD and AL were higher for the test group (p=0.001).

The values of serum and urinary markers for the renal function are presented in table 2.

Table 2. Serum and urinary markers for the control and test groups after the initial treatment

Marker	Group	Mean value	SD	Mean value	Minimum	Maximum
Serum albumin (g/dL)	Control	4,9	0,5	5,0	3,4	5,8
	Test	4,7	0,4	4,7	4,1	5,6
Serum creatinine (g/dL)	Control	0,9	0,2	0,9	0,6	1,3
	Test	1,0	0,2	1,0	0,7	1,3
Urinary creatinine* (mg/kg.24h)	Control	18,45	4,30	18,09	11,44	29,02
	Test	17,14	4,75	16,33	10,31	32,99
Serum ureic acid (mg/dL)	Control	4,3	1,7	4,1	1,3	8,0
	Test	4,9	2,1	5,0	1,4	8,9
Urinary ureic acid (mg/24h)	Control	542,2	219,0	520,1	194,6	1089,0
	Test	526,5	222,1	471,1	203,5	1055,0
Serum urea (mg/dL)	Control	30	9	30	12	48
	Test	29	10	28	17	59
Urinary urea* (g/24h)	Control	25,9	8,0	23,5	13,1	44,6
	Test	24,5	11,0	23,8	9,0	52,8

SD: Standard Deviation
*the data transformed in logarithms before the t-Test

No significant difference was observed between the two groups for any variable. The same aspect was also observed for the glomerular filtration rate: creatinine clearance (mean), abbreviate modification of diet in renal disease (mean) and urinary albumin/creatinine ratio (mean) (Table 3).

Table 3. Glomerular filtration rate estimated on control and test groups subjects

Variable	Group	Mean	SD	Mean	Minimum	Maximum
Creatinine clearance* (mL/min/1,73 m^2)	Control	9,368	22,05	90,59	60,01	146,47
	Test	85,28	21,74	79,72	52,40	149,40
AMDRD[b] (mL/min/1,73 m^2)	Control	81,27	13,28	77,57	62,90	115,43
	Test	78,16	12,03	76,96	62,62	127,40
Urinary Albumin/Creatinine (mg/g)	Control	4,87	3,25	4,25	1,42	16,21
	Test	5,53	4,72	4,36	1,16	20,85

AMDRD: abbreviate modification of diet in renal disease
SD: Standard Deviation
*t-Student test applied on long transformed data (P<.05); Mann-Whitney Test (P<.05)

The absolute frequencies and the percentages for the renal function markers within and out of the reference intervals for the two groups are presented in Table 4.

Table 4. The frequencies and the percentages for the renal function markers within and out of the reference intervals for the two groups after the initial treatment

Variable	Classes	Control		Test		RI
		Fr	%	Fr	%	
Serum albumin (g/dL)	Within RI	21	70,0	25	83,3	3,5-5,2
	< RI	1	3,3	0	0,0	
	> RI	8	26,7	5	16,7	
Serum creatinine (mg/dL)	Within RI	29	96,7	29	96,7	M:0,9-1,3
	< RI	1	3,3	1	3,3	F:0,6-1,1
Urinary creatinine (mg/kg. 24 hours)	Within RI	11	36,7	9	30,0	M:21-26
	< RI	16	53,3	20	66,7	F:16-22
	> RI	3	10,0	1	3,3	
Serum ureic acid (mg/ dL)	Within RI	23	76,7	21	70,0	M:3.5-7.2
	< RI	4	13,3	5	16,7	F:2,6-6,0
	> RI	3	10,0	4	13,3	
Urinary ureic acid (mg/24 hours)	Within RI	28	9,3	29	96,7	< 1000
	> RI	2	6,7	1	3,3	
Serum urea (mg/dL)	Within RI	25	83,3	25	83,3	15-40
	< RI	1	3,3	0	0	
	> RI	4	13,3	5	16,7	
Urinary urea (g/24 hours)	Within RI	12	40,0	8	26,7	26-43
	< RI	17	56,7	18	60,0	
	> RI	1	3,3	4	13,3	

M: male
F: females
RI: reference interval
Fr: frequency (number of patients reported to RI)
Statistical analysis: c2 Test (P<.05).

No matter the analyzed variable, there is no evidence that the results frequency within or out of the reference interval is different between the two groups. The same aspect was observed also for the glomerular filtration rate (Table 5).

Table 5. The frequency and the percentage for the control and test subjects with glomerular filtration rate variables are inside and out of the reference intervals.

Variable	Classes	Control		Test		RI
		Fr	%	Fr	%	
Creatinine clearance (mL/min/1,73m^2)	Within RI	23	76,7	20	66,7	35 – 44 yrs old: 74 – 138
	< RI	5	16,7	9	30,0	45 – 54 yrs old: 74 – 129
	> RI	2	6,7	1	3,3	55 – 64 yrs old : 69 – 122
AMDRD[b] (mL/min/1,73 m^2)	Within RI	20	66,7	20	66,7	35 – 44 yrs old: 74 – 138
	< RI	10	33,3	10	33,3	45 – 54 yrs old: 74 – 129
						55 – 64 yrs old: 69 – 122
Urinary Albumin/Creatinine (mg/g)	Within RI	30	100,0	30	100,0	≤ 30

RI: reference interval
Fr: frequency
AMDRD: abbreviate modification of diet in renal disease
Statistical analysis: c2 Test (P<.05).

DISCUSSIONS

In this study the possible association between the periodontitis and renal dysfunction was assessed by renal markers testing on two subjects groups (control group and test group).

Many analysis sets applied to the control group demonstrated that a higher number of teeth, PPD< 3mm, AL<3mm, low BOP and AL are associated with higher levels of serum ureic acid, urinary urea and urinary volume, although their levels remained within the reference intervals.

Moreover, a high number of sites with PPD of 3-5mm was correlated with a higher creatinine clearance. A higher number of sites with PPZD<3mm and low BOP was associated in the control groups with higher levels of urinary creatinine, creatinine clearance and low levels of serum albumin. Also, a higher number of sites with PPD>6mm was correlated with a low albumin/creatinine ratio and a higher number of teeth with high levels of serum creatinine. In the test group a low PI was associated with higher serum and urinary ureic acid. [5, 6]

The multivariate correlation test did not reveal any supplementary results, the correlations being irrelevant. As an example, the correlation between the high levels of ureic acid, urinary urea, urinary volume and creatinine clearance and a higher teeth number, a great part of PPD<3mm and of 3-5mm in the control group might be the result of a better mastication process, leading to an improved proteins and nucleoproteins digestion [1, 7, 8].

The superficial periodontal pockets were found in 90% of all the sites in the control group. The control group presented a mean value of AL around 7.63% and a mean severity of 1.0mm; the AL value in the test group was around 62.44% of the sites, with a mean value of 2.58mm. Therefore, a number 8 times higher in the oral cavity was affected by attachment loss in the test group and the severity was 158% higher than in the control group. The PPD values in the control group were lower than in the test group. More than 50% of the sites were affected in the test group, with a mean value for the severity of 2.25mm (5.23% and 1mm, respectively for the control group). In this way, the two groups were distinct.

Our model for this study is influenced by certain factors (smoking, pregnancy, hormonal contraceptives, antibiotics, NAIDs) [9]. Therefore, the slight correlation between periodontitis and renal disease observed in our study might indicate that a severe renal disease can influence the progression for the periodontal disease and vice versa [10, 11].

CONCLUSIONS

Inside the limits and the methodology of this study, our result may suggest that chronic periodontitis was slightly correlated to the renal dysfunction. Future studies regarding the interventional therapy might clarify and consolidate these results. Periodontitis patients presented changes of the serum and urinary markers of the the renal dysfunction, suggesting that the periodontal disease and treatment might affect the renal functionality.

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STUDY REGARDING THE NEUROPSYCHIC PATHOLOGY IMPLICATIONS IN PERIODONTAL PATHOLOGY

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ABSTRACT

Introduction: Epilepsy, in all its forms, must be known by the dental specialists who always can encounter an epileptic seizure when treating such patients. Many times, the medication of epileptic patients might contravene with dental treatment, another reason for a hightened attention to this disease. **Purpose of the study:** The purpose of this study consisted in the assessment of periodontal changes on epileptic patients with various types of seizures, correlated to the systemic modifications determined by the disease state and to the administrated drugs. **Materials and methods:** We evaluated a number of 58 patients with epilepsy diagnostic, based on neurologic observation sheets and on speciality clinical examination (dento-periodontal) and radiologic examination (apical radiographs and panoramic radiographs). **Results:** Analysing the relationship between epilepsy and other diseases, we observed that the associated pluripathology is the most frequent. We noticed that periodontal diseases appears mostly on patients with multiple drugs therapy, in contrast to the ones with monotherapy. The most important changes occur on phenytoin and carbamazepine medications. **Discussions:** In this study we observed the occurrence of periodontal lesions inhanced by entiepileptic drugs medication and by neuropsychic factors, life conditions, sedentarism and by an impaired oral hygiene. **Conclusions:** The antiepileptic drugs frequently induce adverse effects on oral cavity tissues. The severity of periodontal lesions depend on the evolution and treatment of the disease. Key-words: epilepsy, anticonvulsivant drugs, periodontal status.

Key words: key word one, key word two

INTRODUCTION

Epilepsy represents a chronic diseease which involves the central nervous system, with a high variety of phenomena in a close relationship, neurological and psychic manifestations. In this context we can observe a symptomatic epilepsy, the result of a cerebral impairment of known cause and an idiopathic epilepsy, with a cause that eludes the common posibilities for investigation and diagnostic [1].

The experimental research observed that the convulsive seizures can be easily provoqued by chemical and electrical stimulation of the normal cerebral tissue; therefore, the normal organism may have an ihibitory mechanism which prevents the cerebral explosions from normal neural

activity. The convulsive seizures appear when, for various reasons, the normal balance between excitation and ihibition is impaired, with a fraction higher than one [1]. Moreover, the cerebral excitability is regulated in great inhibitory areas acting on cerebral cortex by extracortical pathways. Therefore, the brain posesses excitability autoregulation mechanisms.

No matter the generating cause, epilepsy, in all its forms, must be known by the dental specialists who always can encounter an epileptic seizure when treating such patients. Many times, the medication of epileptic patients might contravene with the dental treatment, another reason for a hightened attention to this disease.

More than 61% of the patients that receive conventional AED (like phenytoin, carbamazepine, valproic acid or phenobarbital) present adverse reactions, contributing to the initial abandonment of the treatment in 40% of the cases [2,3,4].

Due to the similarity of the therapeutical efficiency of a certain type of seizure, the general adverse effects of the drugs become the most important criterion in choosing the anti-epileptic drug. Oral pathological alterations represent an important adverse reaction of the AED, such as gingival enlargements, xerostomia, glositis, stomatitis, ulcerations, slow tissue regeneration, post-surgical gingival bleeding etc. [5].

PURPOSE OF THE STUDY

The purpose of this study consisted in the assessment of periodontal changes on epileptic patients with various types of seizures, correlated to the systemic modifications determined by the disease state and to the administrated drugs.

MATERIAL AND METHODS

This study was conducted on 58 patients, examined and treated in Neurology Clinic of Neurosurgery Hospital Iași, with various forms of epilepsy, lasting from a few months to a few years.

The neurological examination was based on clinical neurological observation sheets. The periodontal examination included the periodontal observation sheet (elaborated by the Periodontal Clinic staff – The Faculty of Dental Medicine – „Gr. T. Popa" University of Medicine and Pharmacy Iași) which included the date from clinical extraoral and intraoral examinations.

Clinical and paraclinical examinations included:

a) Gingival overgrowth severity

b) Papillary bleeding index (PBI)

c) Radiographs to assess the alveolar bone level

d) Extra and intraoral photographs for the study autentification.

The radiologic examination is uselful in the assessment of the alveolar bone tissue loss and it was conducted based on the apical and panoramic radiographs.

After the clinical and paraclinical examination we analyzed the following aspects:

- The patient environment
- The age groups
- Other diseases in medical history
- The drug therapy (monotherapy or multiple drugs therapy)
- Periodontal changes due to anticonvulsivant drugs
- The presence/absence of the periodontal disease
- Periodontal symptomatology
- Determinant and modifying factors for periodontal diseases.

RESULTS

The study group was a homogenous one – 30 females (52%) and 28 males (48%). Regarding the addressability for dental treatment, we observed a high percentage in

the young patients (Fig.1).

We analysed the type of epileptic seizure and the time since the disease onset (Fig.2)

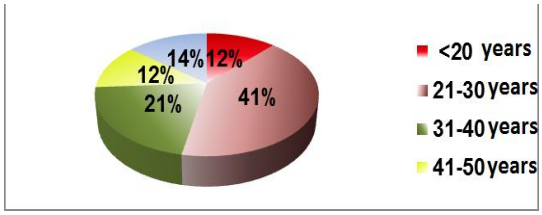

Figure 1. The distribution on age groups. We observed a high percentage for 21-30 years old group

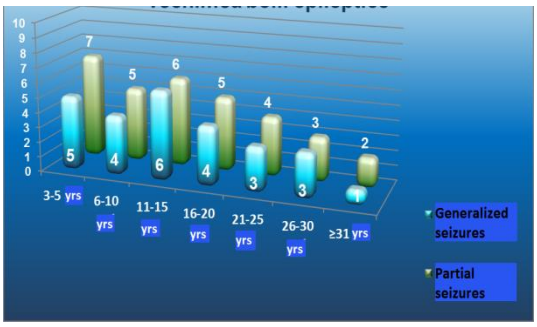

Figure 2. The distribution on epileptic seizure type and the time since the disease onset.

Assessing the relationship between epilepsy and other diseases we observed a high predominance of the associated multiple diseases (53% of the cases). The majority of the cases included psychic diseases (25%), cardiovascular disease, gastro-intestinal diseases and liver diseases (fig.3).

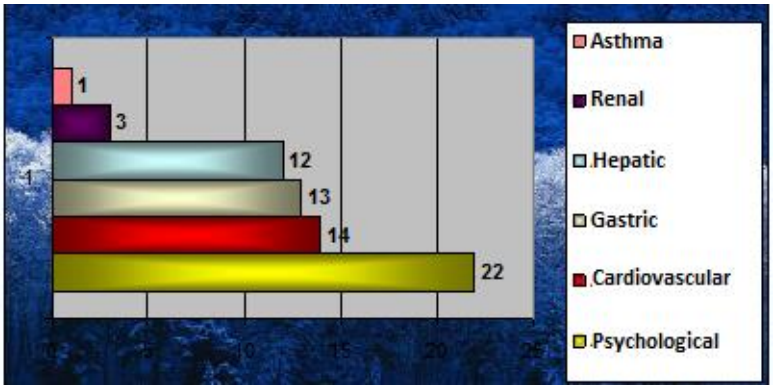

Figure 3. The distribution of associated pathology

In this study we encountered the following adverse effects for the anticonvulsivant drugs:

I. Neurological effects: headache, vertigo, coordination impairment, ataxia, dysarthria, nistagmus, tremor (accentuated on phenytoin and barbituric drugs).

II. Psychopathological:

- Sleepiness, adynamy, apathy, perception and thinking processes impairment (more pronounced on phenobarbital and its derivatives).
- Irritability, excitability, insomnia (frequently on phenytoin therapy).
- Euphoria (carbamazepine, phenytoin and phenobarbital patients).

III. Haematological effects: leukocytosis (carbamazepine), leukopenia with agranulocytosis (phenytoin, barbituric drugs), thrombocytopenia (phenytoin, carbamazepine);

IV. Skin and mucosae effects: exanthem, gingivitis (long usage of phenytoin), drug induced fibromucosal hyperplazia (on Dilantin administration).

V. Visceral effects: more frequently, GI tract effects (phenytoin) and durg induced hepatitis (barbituric drugs).

VI. Endocrinological effects: myxedema, cachexia, impotence, hyperpigmentation,

hyperthrichosis – long usage of phenytoin.

The number of adverse effects were determined by valproic acid and carbamazepine was reduced; phneytoin (alone or in multiple drugs therapy) induced important adverse effects (Table 1).

Table 1. Adverse effects on AED

	Phenytoin	Carbamazepine	Valproic Acid
Gingival hyperplasia	++	+	
Hyposalivation/xerostomia		+	+
Teguments	++	+	
Neurological	+		
Psychopathological	++	+	
Haematological	+	+	
Visceral (gastric/hepatic)	+	+	+
Endocrinological	++	+	

Regarding monotherapy, we observed the following values: carbamazepine – 14 patients (33.33%), valproic acid (depakine, sodium valproate) – 8 patients (19.04), phenobarbital (luminal) – 2 patients (4.76%), phenytoin – 14 patients (33.33%) and 4 patients treated with Primidon (9.52%).

Sixteen patients received multiple drugs therapy (Fig.4).

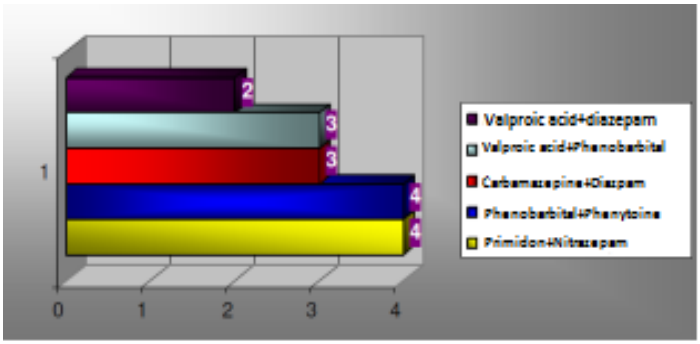

Figure 4. The distribution of multiple drugs therapy

The periodontal changes occur mostly on multiple drugs therapy patients, in contrast with monotherapy patients (87.5% and 69.04%, respectively). The most severe changes are induced by phenytoin administration (83.33%) and carbamazepine therapy (82.35%); a number of changes occured also on sodium valproate patients (46.15%).

The predominant periodontal symptomatology on these patients includes spontaneous bleeding, inflammation, gingival hyperplasia, dental mobility and true/false periodontal pockets (Fig.5).

Eleven patiens presented periodontal lesions (18.96%), with disease onset under 3 years and with a good oral hygiene. The periodontal disease signs were present on the rest of 47 patients (81.04%), patients with an improper oral hygiene.

The clinical and paraclinical examinations revealed that 35 patients presented gingival overgrowths, induced by the antiepileptic drugs, evolving in the context of an already present periodontal disease (Fig.6).

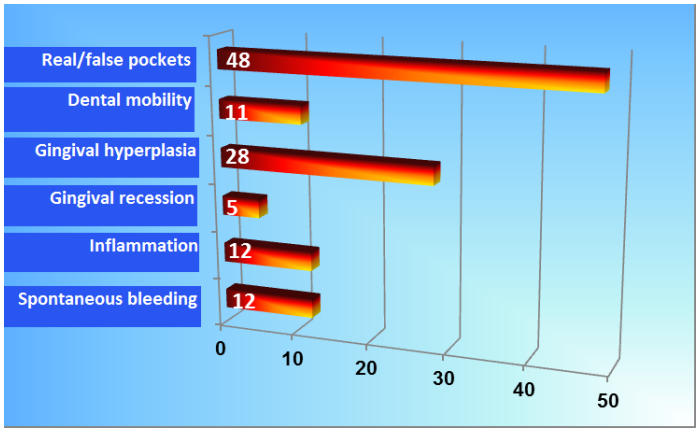

Fig.5. Periodontal manifestations (no. of cases)

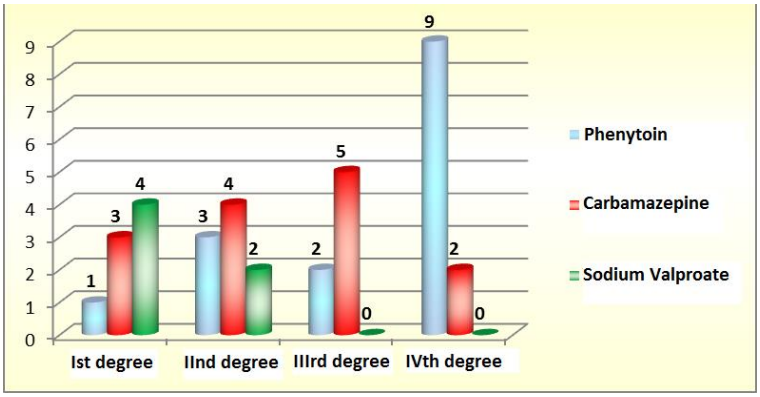

Fig.6 Distribution of the gingival overgrowth degrees, determined by AED

DISCUSSIONS

This study included a number of 58 patients with various forms of epilepsy, lasting from a few months to a few years, of which 28 males and 30 females, diagnosed with generalized seizures (26 patients) and partial seizures (32 patients). Regarding the addressability for dental treatment, we observed a high percentage of young patients, due to the fact that these patients have a knowledge of their disease and want to maintain the integrity of the dental arches for a long time, having in mind that this disease increases the risk for numerous lesions even in the case of a rigorous oral hygiene [6,7].

In a previous study we emphasized that the epileptic patients present an impaired oral health status in contrast to non-epileptic patients. These changes depend on the epileptic disease severity, supporting the value of epilepsy as a risk factor for periodontal disease [8].

In this study we observed the periodontal disease lesions determined by AED and also by neurological and psychic factors, environment conditions, sedentarism and impaired oral hygiene.

Analysing the clinical and paraclinical data, this study revealed that antiepileptical drugs frequently induce adverse effects on oral cavity tissues. The degree of the periodontal involvement depends on the disease onset and treatment period of time. We observed a direct relationship between these elements: longer the antiepileptic treatment, more important the periodontal lesions become.

The affected periodontal tissue determines aesthetic concerns such as gingival overgrowth, especially on young patients with poor oral hygiene; the oral asepsy can be achieved by oral rinses. In cases of severe

gingival lesions, the dental specialist should not cess the AED by himself; in such situations an interdisciplinary consult is recommended (dental specialist-neurology specialist).

CONCLUSIONS

The antiepileptic drugs frequently induce adverse effects on oral cavity tissues. The severity of the periodontal involvement depends on the disease onset and on the treatment period of time. The periodontal changes were determined by the bacterial factor, present in all the cases, but also enhanced by antiepileptic drugs administrated on long periods of time.

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CLINICAL AND BIOLOGICAL CORRELATIONS BETWEEN METABOLIC SYNDROME AND OXIDATIVE STRESS IN THE ELDERLY

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ABSTRACT

Introduction. The chronic oxidative stress (OS) increases the production of free radicals and leads to a proinflammatory systemic condition. This one triggers the development for metabolic syndrome (MS) which is expressed by the pathological features of the modern civilization diseases (overweight, obesity, hypertension, dyslipidemias, cardiovascular disease, stroke, type 2 diabetes, cancer). Free radicals are also considered today the main cause of aging, and their control is a necessary modern strategic link that may delay or slow the senescence process. **Objective:** We aimed to evaluate the level of the oxidative stress in a lot of patients with metabolic syndrome compared to that of a lot of healthy adults. **Method and material.** We have evaluated 3 groups of patients: a control group (M) consisting of 30 healthy adults (student volunteers), and 80 patients diagnosed and treated for metabolic syndrome, out of which group A (patients younger than 65) and group B (patients aged over 65). There were evaluated clinic and metabolic characteristics of the patients with metabolic syndrome; these were correlated with the level of antioxidant enzymes such as SOD (superoxide) and GPx (glutathione peroxidase), while the lipid peroxidation was monitored by quantifying MDA (malondialdehyde). **Results:** Elderly patients with metabolic syndrome summarize clinical and metabolic features of antioxidant defense depending on the degree of lipid peroxidation. Thus it was observed that the oxidative stress increases with age, demonstrated by an increased level of antioxidant enzymes compared with group M. There were no statistically significant differences between the two groups A and B concerning the high levels of OS. In exchange there was found a definite increase of lipid peroxidation in group B compared to group A, proved by a statistically significant increase of MDA in the former group. **Conclusions:** The oxidative stress intensifies with age. Each of the components of MS is correlated positively and independently with systemic OS. Metabolic syndrome correlates with increased oxidative stress, demonstrated by increased levels of antioxidant enzymes (SOD and GPx) compared to controls. In the elderly with MS there was proved a significant increase of MDA compared to group A as to control group, demonstrating that the increased degradation phenomena of lipid peroxidation plays an important part in the process of senescence and justifies the association of antioxidant therapies.

INTRODUCTION

The oxidative species occur in the human body as a physiological consequence of aerobic metabolic processes, but they can excessively increase in abnormal conditions. The imbalance between the level of oxidation and antioxidant capacity of the body is called oxidative stress (OS) and plays an important part in the origin of severe diseases with high prevalence in modern medicine.(1, 2)

Metabolic syndrome (MS) is a good example in this regard. Each of the components of MS are proven cardiovascular risk factors. The diagnosis of MS relies on the presence of any 3 of the 5 conditions that define the syndrome. (1, 2, 3) These conditions are: obesity (increased abdominal circumference; according to country and race > 102 cm in men and > 88 cm in women), increased seric triglycerides (or medicamentous treatment for hypertriglyceridemia as an alternative indicator; >150 mg/dl, 1,7 mmol/l), decreased HDL- cholesterol (or medicamentous treatment for decreased HDL-cholesterol as an alternative indicator; ≤40 mg/dl (1,0 mml/l) in men and ≤50 mg/dl (1,3 mmol/l) in women), increased blood pressure (or medicamentous treatment for hypertension in a patient with hypertensive history as an alternative indicator), hyperglycemia (or medicamentous treatment for hyperglycemia as an alternative indicator; >110 mg/dl (6.1 mmol/l) (WHO) , >100 mg/dl (5.6 mmol/L) (ADA). (4, 5)

While the body is ageing it loses the ability of producing its own antioxidants, being exposed to the attack of free radicals. (6, 7, 8)

This work presents the results of studies that evaluated the way in which systemic OS is correlated with some cardiovascular risk factors (obesity, dislypidemia, hypertension) in adults and in the elderly. We evaluated the oxidative stress by identification of the oxidative aggression and the antioxidant capacity in the studied lots of patients.

MATERIAL AND METHODS

In order to evaluate the involvement of the free radicals in metabolic syndrome, we have developed a clinical prospective study in the Vth Internal Medicine Clinic in the Universitary Hospital CF Iasi between nov 2011 and march 2012.

We have compared the clinical and metabolic profile and the oxidative features in a lot of 80 patients (40 men and 40 women) admitted in our clinic with metabolic syndrome with the same data of 30 healthy patients (volunteer students).

For the patients with MS there was performed anamnesis, clinical examination and biological investigations: CBC, ureea, creatinine, glucose, cholesterol, triglycerides, HDL-cholesterol and LDL-cholesterol, resting ECG, chest X-ray, abdominal ultrasound examination.

The level of the antioxidative activity was measured by antioxidant enzymes such as superoxide dismutase (SOD) and glutathione peroxidase (GPx), while the level of the lipid peroxidation was monitored by quantifying malondialdehyde (MDA).

RESULTS AND DISCUSSIONS

Analyzing the data of the patients with MS there were noticed some clinical particularities. The mean age of the patients with MS with age ≤ 65 was 57.7, and the number of women was approxiamtely equal to that of the men. Out of the elderly the mean age was 70.4, with a higher incidence of the masculine gender (in a report of 3/1 with the feminine one).

All the patients were obese, dyslipidemic and hypertensives and were alocated in 2 groups: patients with MS and the age ≤ 65 (group A), and patients with MS and the age > 65 (group B).

All the studied patients presented abdominal obesity, with different increase of the body mass index (BMI). Smoking was another cardiovascular risk factor more frequently associated in group A (47% smokers in group A versus 11% smokers in group B).

In group A it was more frequently present hypertension grade II or III, whereas in group B there was more frequent hypertension grade

I or II (tabel I).

Dyslipidemia was present in all patients with MS, in different forms and severity. Thus, in group A there was an important increase in total cholesterol mainly based on increasing LDL-cholesterol. In the elderly with MS (group B), all patients (100%) had low levels of HDL-cholesterol compared to only 68% in group A.

In group B 33.3% of the patients showed an isolated decreased HDL-cholesterol comparing with only 24.0% in group A, the rest involving other lipid fractions disturbances. Serum triglyceride values showed a similar dynamic in both groups, showing significantly higher values for female patients and highly statistically significant increase for male patients.

Table 1. Clinical features of pacients with MS

CLINICAL FEATURE	GROUP A	GROUP B
THE AGE	**57,70**	**70,41**
THE GENDER (M:F)	**1/1**	**3/1**
SMOKE	**47%**	**11%**
DEGREE OF HTA	**GRAD II, III**	**GRAD I, II**
DYSLIPIDEMIEA	**Increased total-colesterol and LDL-colesterol**	**Decreased HDL-colesterol**
COMORBIDITIES	**44,4%**	**75%**
-Ischemic heart desease	75%	88,8%
-Peripheric arteriopathy	33,3%	16,6%
-Diabetes	25%	11,1%
-stroke	16,6%	0,08%

Group B had a higher association with comorbidities (75%) compared to only 44% in the group A. It is to be mentioned that while ischemic heart disease in its various forms had a higher frequency in group B compared to group A, all the other comorbidities (diabetes, stroke, peripheral artery disease) were significantly rarely in the elderly.

Analyzing the antioxidant enzyme systems within the three groups, namely control group, group A and group B, it seems that MS correlates with enhanced oxidative stress, in both studied groups being noticed a significant increase of the antioxidant enzymes compared to the control group. It was surprising that we found no significant differences between the antioxidant level between groups A and B.

On the other hand, the level of the lipid peroxidation (MDA), which didn't show differences between the control group (M) and group A (young adults with MS) is significantly increased in the group B (elderly with MS). It seems that this result is consistent with already known data that consider the important part played in ageing by the OS and especially lipid peroxidation (tabel 2).

Analyzing the results obtained in the two groups we see that age is positively correlated with increased levels of antioxidant enzymes (GPx and SOD) as a result of intensification of oxidative stress. The increase of the OS,

evident in both groups, proportionally varied with the increase of patient's weight, correlated with increased abdominal circumference (over 102 cm in men and over 84 cm in women), but with no correlation with the degree of obesity (BMI).

Table 2. Levels of oxidative stress in the three groups

Groups	SOD (U/l)	GPX (UI/ml)	MDA (µmol/l)
Group M	**383,5**	**0,477**	**0,413**
Group A	**411,75**	**1,18**	**0,459**
Group B	**403,9**	**1,06**	**0,611**

Hypertension is also associated with increased levels of antioxidant enzymes regardless the age of the patient or severity of hypertension. Intensification of oxidative stress in both groups accompanies vascular, cerebral, cardiac and metabolic comorbidities and their complications.

Regarding the conditions associated to intensification of lipid peroxidation, the significantly high level of the MDA in group B refers to the type of dyslipidemia and associated vascular comorbidities. In the elderly with MS the statistically significant reduction in HDL cholesterol also significantly correlates with increased MDA levels both compared to group A as to the control group, suggesting that increased lipid peroxidation plays an important part in senescence. Also, higher levels of MDA in group B is associated with increased clinical manifestations of coronary atherosclerosis. These data correlate with those in the literature that show an inverse association between HDL-cholesterol levels and risk of coronary heart disease.

CONCLUSIONS

1. The oxidative stress intensifies with age.
2. Each of the components of MS (obesity, dyslipidemia, hypertension) is positively and independently correlated to the oxidative stress.
3. The metabolic syndrome correlates with increased oxidative stress, demonstrated by increased levels of antioxidant enzymes (SOD and GPx) compared to controls.
4. In the elderly with MS a very significant increase of MDA comparing to group A as to the control group is associated with statistically significant reductions in HDL cholesterol, proving that increased lipid peroxidation has a clear role in senescence.
5. A combination of antioxidant therapies to the medical treatment to the elderly is useful and scientifically proven.

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STATISTICAL STUDY REGARDING THE PREVALENCE OF THE PERIODONTAL PATHOLOGY ON THE TEENAGER PATIENT

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ABSTRACT

Introduction: Periodontal disease can manifest different forms on children and teenagers, with a large number of lesions, from gingival tissue destruction to profound periodontal lesions which can lead even to tooth loss in certain cases. **Purpose of the study:** The purpose of this study was to assess the presence or the severity of the periodontal disease and the oral hygiene in a group of teenagers. **Materials and methods:** The study group consisted in a number of 33 teenagers. We realized: clinical examination on each patient, with bleeding index, gingival and periodontal inflammation index and questionnaires, with general patient data, chief complaints, periodontal history, risk factors, sanitary education degree. **Results:** Most cases presented chronic gingivitis determined by bacterial plaque; only a few number of patients presented alveolar bone loss. In these cases class I Miller recessions were predominant. **Discussions:** Practically, all the oral manifestations included bacterial plaque accumulations and a intensification of the microbiota, creating favorable conditions for gingival inflammations**. Conclusions**: Every patient presented a certain degree of periodontal impairment. An educational program leading to a decrease in frequency of the periodontal disease is necessary.

Key words: teenager, periodontal status, oral hygiene

INTRODUCTION

The periodontal disease is a destructive inflammatory disease, bacterial plaque being a primary factor in its etiology, along with numerous local and general risk factors. Periodontal disease manifest different forms on children and teenagers, with a large number of lesions, from gingival tissue destruction to profound periodontal lesions which can lead even to tooth loss in certain cases [1].

Periodontal disease in teenagers is characterized by: gingivitis, periodontitis, periodontal manifestations enhanced by systemic diseases [2]. The manifestations and the evolution of the periodontal disease are different for each form. Irritative functional factors modify the defense capacity of the organism; they do not initiate the destruction process but accelerate the progression of the lesions.

Certain periodontal disease forms, some of them aggressive forms, may affect children and teenagers. Bacterial plaque is the main

etiologic factor but local and general modifying factors may be identified from anamnesis and clinical examination of the child or teenager [3]. The exact cause of every form of these diseases is still unclear but it might be influenced by the periodontal microbiota components and by the intensity of the host response. Numerous systemic factors can modify the plaque effect on the host. The environment and the genetic factors could affect the balance between the microorganism and the host [4].

Different forms of the periodontal disease can be present on children and teenagers, from reversible forms limited on gingival tissue to forms characterized by attachment loss and bone loss which can determine also tooth loss [5, 6].

The manifestations of periodontal disease in children depend on two factors: infectious factor and general status. The infectious factor represents the quantity of the accumulated bacterial plaque and its structure. This depends mainly on the presence/absence of the factors that support the retention of the bacterial plaque (dental malpositions, malocclusions, carious lesions) and also on the socio-economic and educational status, leading to gingival inflammation, identified by bleeding indices [7]. On children with good health, without systemic disease, gingivitis can stagnate for a long period of time, without an evolution to periodontitis. Passing to the adolescence, in case of a lack of good oral hygiene, the hormonal modification specific to the age can aggravate the gingival inflammation [8].

Rarely, gingivitis can evolve to a hyperplasia form, in a correlation with a local irritative factor, frequently associated to general diseases and specific drugs administration.

When the osseous destruction occurs the disease becomes more complex, with a high importance of the genetic factor. Aggressive forms of the disease are encountered in children and teenagers [2, 9]:

- Prepubertary periodontitis, associated with genetic impairments (Down syndrome, Klineffelter syndrome, Turner syndrome, Papillon-Lefevre syndrome);
- Localized/generalized juvenile periodontitis, with specific microbiota and genetic determinism;
- Rapid progressive periodontitis, as a continuous form of the juvenile periodontitis or as an independent form, mainly in the age between teenager and young patient.

Chronic forms of periodontitis are rarely encountered and, when it appears, it is in superficial forms [2, 8].

Periodontal diseases affecting the children and the teenagers are numerous ones and can be included in the following clinical forms:

- Gingivitis
- Early onset periodontitis
- Acute necrotizing ulcerative gingivitis/periodontitis
- Incipient adult periodontitis
- Periodontitis associated with systemic diseases

PURPOSE OF THE STUDY

The purpose of this study was to assess the presence or the severity of the periodontal disease and the oral hygiene in a group of teenagers.

MATERIAL AND METHODS

The study was conducted on a group of 33 teenagers, with the age between 13 and 18 years old (19 girls and 14 boys) examined in the Periodontal Clinic, "Gr. T Popa" University of Medicine and Pharmacy, during the year of 2012.

The methods used in this study were the following:

- Clinical examination of every patients with the recording of bleeding indices, gingival and periodontal inflammation indices

(PBI, SBI, CPITN)

- Questionnaires – with: general data of the patient, chief complaints, periodontal history, risk factors, sanitary education degree.

We obtained data regarding the sex, age, education, occupation, geographical area, living environment, socio-economic profile, the addressability, diet habits, oral hygiene, vicious habits, systemic diseases, physiological status. These information were analysed and statistically assessed.

RESULTS

Nine subjects came from rural environment and 24 subjects from urban environment. The age groups distribution is presented in Figure 1.

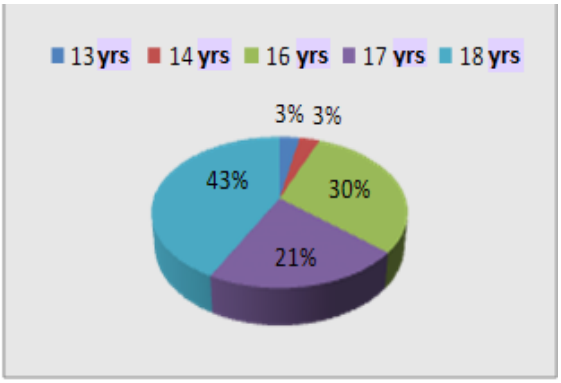

Figure 1. Age groups distribution

Regarding the alimentary habits, 33 patients preferred a diet full of carbohydrates, 13-hard consistence aliments, 14- soft consistence aliments and 12 patients preferred spiced aliments.

The chief complaints included odontal issues (33 cases) and bleeding (22 cases) (Fig.2).

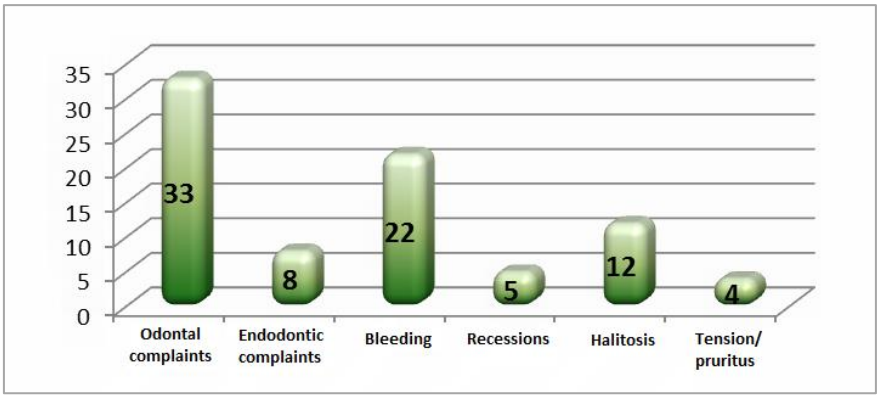

Figure 2. Distribution of the chief complaints

Regarding the oral hygiene habits, dental brushing two times a day was the predominant form (79%); the mouthwash is rarely used (95% of the subjects declared that they used it rarely) and the flossing is absent on 88% of the subject.

We examined 924 teeth on 33 patients, 338 presenting periodontal disease signs (36258%) (fig.3).

Most cases presented chronic gingivitis determined by bacterial plaque; only a few number of patients presented alveolar bone loss. In these cases class I Miller recessions were predominant.

The cases with periodontal pockets were limited; all of them presented superficial forms with periodontal pockets under 3 mm and osseous destruction under 30% of the root length. All the superficial periodontitis cases were chronic forms due to the high quantity of bacterial plaque and calculus, with a slow evolution; they reacted well only to classic scaling with oral hygiene improvements, thus excluding aggressive forms of periodontal disease.

We observed that most cases presented a moderate inflammation. PBI index was of value 1 on 24 subjects and SBI – value 1 on

25 patients and value 2 on 10 subjects.

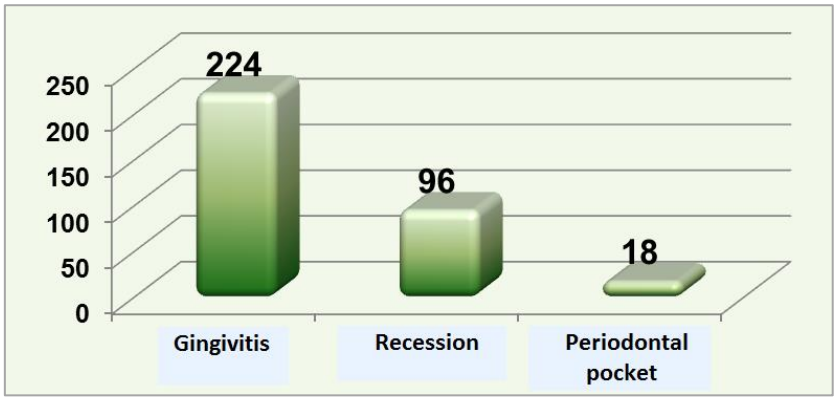

Figure 3. Distribution of the periodontal disease forms on number of teeth

The same low to moderate values were present for the plaque index (<1 on 19 subjects), for the calculus index (value 1 on 16 subjects) and also for the periodontal inflammation index and CPITN (Fig.4, 5).

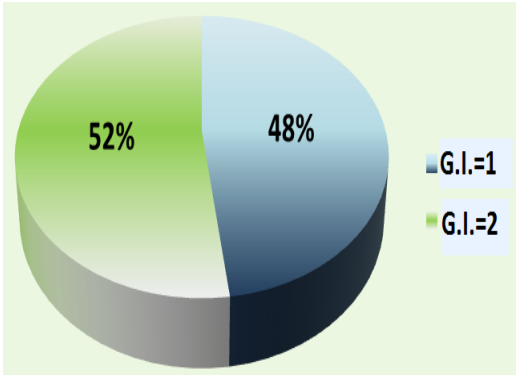

Fig.4. Gingival inflammation index

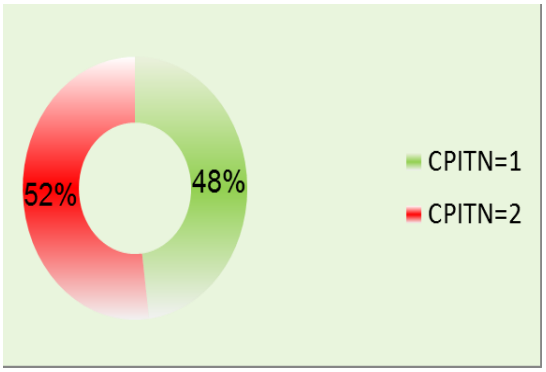

Fig.5 CPITN values

DISCUSSIONS

The addressability degree was higher for the girls than for the boys (58% and 42%, respectively).

The USA studies on group ages show that gingivitis prevalence is higher for the boys 13-17 years old than for the girls [2]. Also, the boys present more inflammatory situses than the girls. Although the reasons for such differences are not quite understood, the boys might have an improper control of the bacterial plaque. These data can correlate to our results, probably in the same context of a heightened attention to the physical aspect.

We remarked that, although the reasons for presentation were generally odontal or orthodontic reasons, all the patients presented a certain degree of periodontal impairment. Practically, all the oral diseases lead to bacterial plaque accumulation and to an intensification of the microbiota, creating favorable conditions for gingival inflammations [4, 5].

Regarding the age, in our study group 80% of the patients were 16-18 years old. This fact can be explained by the heightened necessity for dental treatment; numerous studies show increased values of the carioactivity indices around the age of 16. In the same time, a mental and emotional maturation occurs

during this period, with an accentuated impact of the sanitary education means.

The adolescence age is a difficult one due to the somatic and psychological modifications. The hormonal "storm" influences the organism on all its levels, including the periodontal level. Practically, the most frequent periodontal disease encountered in the dental office is chronic gingivitis determined by the bacterial plaque but we can affirm that it is hormonally modulated. Chronic periodontitis (localized or generalized) rarely appears, more frequently around the age of 18. The juvenile periodontitis represents an even more rare form of the disease [5].

CONCLUSIONS

Every patient presented a certain degree of periodontal impairment. We could not find any cases of aggressive periodontitis, probably due to the low number of subjects.

The clinical examination was correlated to the questionnaire data, showing high deficiencies in the knowledge of oral hygiene means and techniques. Practically, an educational program leading to a decrease in frequency of the periodontal disease is necessary.

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THE PARTICULARITIES OF THE MAINTENANCE THERAPY IN PERIODONTAL-IMPLANT-PROSTHETIC FIELD FOR THE PERIODONTIC PATIENT

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ABSTRACT

Introduction: The incidence of total edentulous cases became very low and the partial edentation is predominant, therefore, implant overdentures is an important alternative for the treatment plan. **Purpose of the study:** The purpose of this study was to evaluate in time the changes of the bone tissue surrounding the dental implants inserted for the treatment of partially edentulous patients, in different overdenture types. **Materials and methods:** The study was conducted on 41 partially edentulous patients, on whom we inserted 245 dental implants, on upper maxilla and mandible, in anterior and posterior areas; the overdentures were conducted in the following situations: dental crown on single implant, implants in dental bridges, overdentures with mixed support (implant and tooth support). We assessed the implant and the prosthetic maintenance. **Results and discussions:** No difference was observed for the three overdentures situations regarding the bone tissue changes. The bone loss after 6 months was higher for the maxilla than for the mandible. The rate of bone loss in the first 6 months was higher in the following situations: bone dehiscence, when using bone grafts or membranes, ceramic-fused-to-metal prosthetics. **Conclusions:** The long term prognosis for single crown and bridge overdentures is favorable.

Key words: dental implant, alveolar bone level, prosthetics, periodontal disease

INTRODUCTION

The incidence of total edentulous cases became very low and the partially edentulous patients are predominant; therefore, implant overdentures are an important alternative for the treatment plan. The psychological benefits and the structure of teeth maintenance are among the most important advantages of implant overdentures [1, 2, 3, 4].

The benefit is higher in Class I and II Kennedy situations, where the traditional bridges generate biological and technical difficulties and for the situations where the partially removable prostheses are rejected by the patients [5, 6].

PURPOSE OF THE STUDY

The purpose of this study was to evaluate in time the changes of the bone tissue surrounding the dental implants inserted for the treatment of partially edentulous patients, in different overdenture types. We also assessed the treatment prognosis, regarding the maxilla structure, the teeth placement, the

implant length, the implant profile, the prostheses type (single crown, bridges), the osseous type (bone dehiscence, severe bone loss), the number of implants per patient and the age of the patient [7, 8].

MATERIAL AND METHODS

The study was conducted on 41 patients (23 males and 18 females, with the age of 25-73 years old), on whom we inserted 245 implants, osseointegrated and treated with implant overdentures.

The implants were inserted in the upper maxilla and mandible, in the anterior and posterior areas. We established the implant maintenance in the prosthetic appliances (single crowns and/or prosthetic bridges) (Table 1).

If the alveolar bone suffers a progressive resorbtion after a longer period of time, the implant could be compromised. Generally, the mandible has a higher osseous density than the upper maxilla. The alveolar bone is also denser in its anterior areas. Moreover, the maxillary sinus and the mandibular canal diminish the available osseous volume, requiring short implants and/or special connections. The vascularization and the healing of the alveolar bone can be compromised in elders. All these parameters have an impact on the alveolar bridge evolution [9, 10].

The distribution of the implant types are presented in Table 2.

Table 1. The distribution of the prosthetics appliances (single crown, prosthetic bridges) on maxilla and mandible

Prosthetic type/ Implant site	Number of implants	Percentage
Single crown	38	14.20%
Implant supported partial overdentures	22	61.75%
Partial overdentures with mixed support (teeth and implants)	24	24.05%
Maxilla	131	62.36%
Mandible	104	37.34%
Anterior areas	157	57.34%
Posterior area	98	42.24%

Table 2. The distribution of the implant length and profile

Implant lenght	6	7	8	8,5	10	11,5	12	13	15	18	20
Number of implants	5	93	10	28	612	7	7	457	387	47	2
Implant type Number of implants	Standard 715	Self-tapping 462	Mk-II 432	5mm 34	Conic 12						

After the prostheses placement the patients were recalled for the evaluation. The observation period since the placement until the last control varied from a year to two years. We assessed the implant maintenance and the prosthetics appliances.

The radiographic evaluation

The peri-implant radiologic assessment of the bone level was conducted by the parallel long cone technique. The baseline radiograph was focused on the implant-abutment junction. the following radiographs were made at every recall. We determined the alveolar bone changes mesial and distal from the implant. Table 3 resumes the number of radiographic measurements per implant (mesial and distal).

Table 3. The number of measurements per implant

Number of measurements	Number of implants
1	1
2	1
3	10
4	14
5	12
6	12
7	8
8	4
9	2
10	0
12	0
	Total - 64 implants

RESULTS

No difference was observed between the three overdentures situations, or between the implant sites regarding the bone tissue changes. The differences between age and sex groups did not influence the bone changes.

We did not find any significant difference on alveolar bone regarding the implants with single crowns or on bridges with mixed support (implant-tooth) (on 6 months after placement: P=0.09, P=0.36).

The bone loss for all the implants was of 1.23 mm after 6 months (SE=0.11), followed by an annual loss of 0.025 mm (SE=0.005), with P<0.001 (Fig. 1). The bone level changes are definitively different between maxilla and mandible (P=0.005), higher for the maxilla.

The following bone loss remains high (0.015 mm/year, SE=0.01) but with P=0.09. The bone loss after 6 months from baseline is significant (P=0.03) (0.38 mm/year, SE=0.17) on sites without bone graft or membranes (Figs. 2, 3).

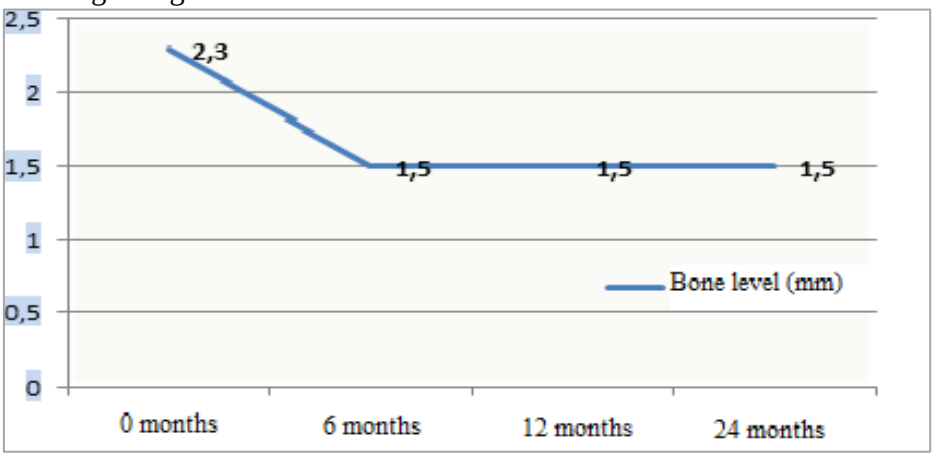

Figure 1. The bone level evolution from 6 months until the prostheses placement and after 6 months for all the implants

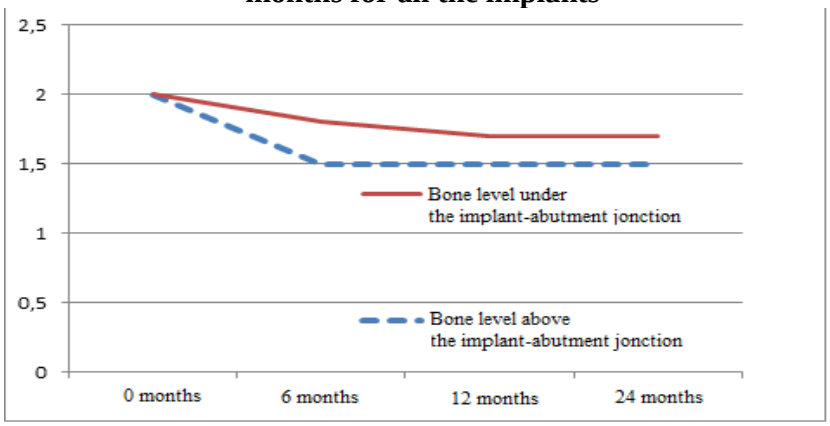

Figure 2. The bone level evolution from 6 months until the prostheses placement and after 6 months for maxilla and mandible

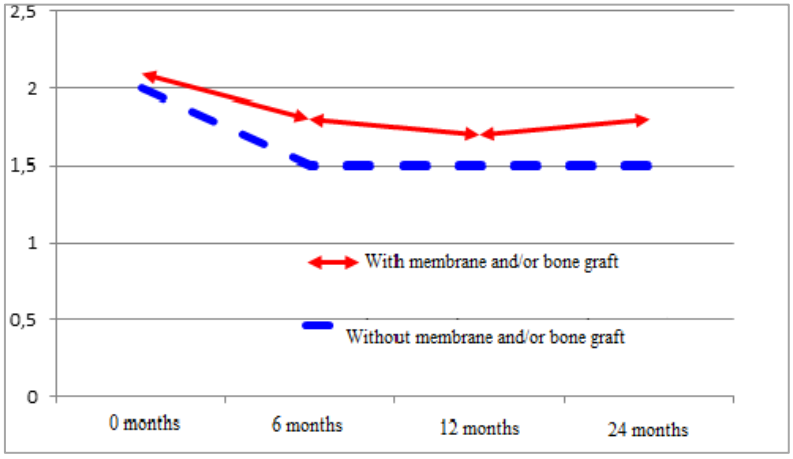

Figure 3. The bone level evolution with and without membrane and/or bone graft from 6 months until the prostheses placement and after 6 months

The bone loss at 6 months after the prostheses placement was 0.30 mm/year (se=0.28) for the implants without bone dehiscence, but without a statistical significance (p=0.29). Although the annual loss after 6 months was of 0.01 mm (se=0.02) for the implants with bone dehiscence, there is not a significant difference (p=0.8) (fig. 4).

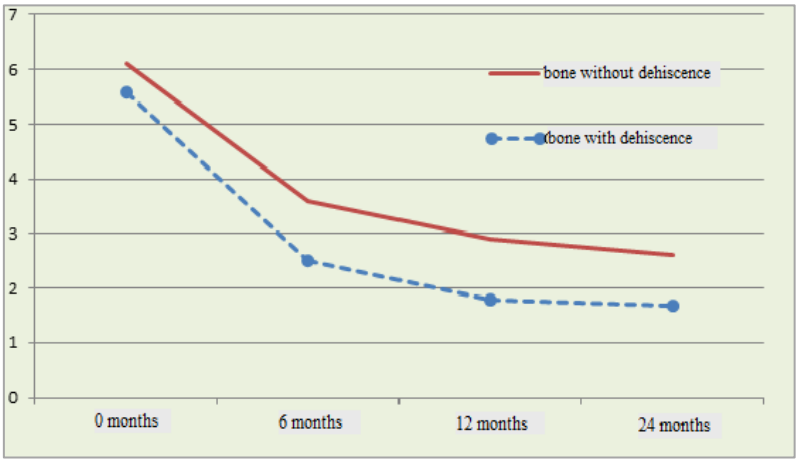

Figure 4. The bone level evolution for implants with and without bone dehiscence from 6 months until the prostheses placement and after 6 months

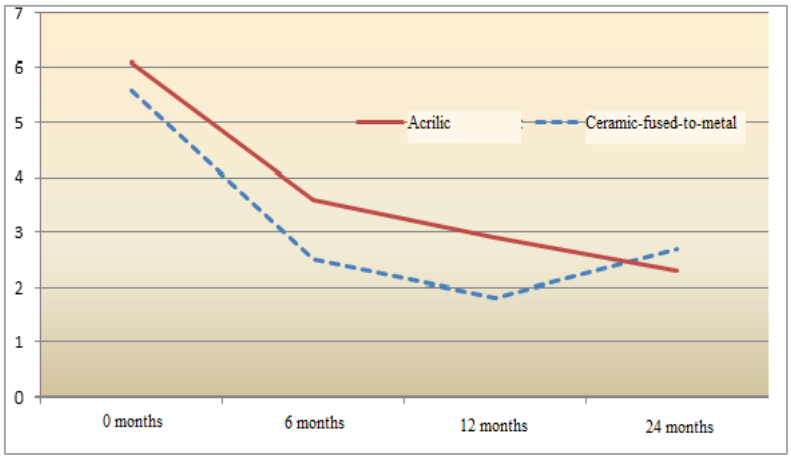

Figure 5. The bone level evolution for implants with acrylic and ceramic-fused-to-metal overdentures from 6 months until the prostheses placement and after 6 months

The bone loss at 6 months after the prostheses placement for 7 mm implants was of 0.13 mm/year (SE=0.28), higher than the values for 15 mm implants, but without a significant difference (P=0.39). After 6 months the loss was higher for 15 mm implants (0.02 mm/year, SE=0.015), but without a significant difference (P=0.1).

The bone loss at 6 months after the prostheses placement was significantly higher for ceramic-fused-to-metal restorations than for acrylic restorations (0.54 mm/year, SE=0.15, P<0.001); the loss after 6 months is not significant (P=0.10) (Fig. 5).

We analyzed the non-inferiority differences between implants with single crowns and implants with bridge restorations. The difference was of -0.54 mm/year (SE=0.25) at 6 months after prostheses placement. The superior limit of the interval is of -0.13 mm /year. The estimated curve is of -0.011 mm/year (SE=0.02). Both curves suggest a better performance for single crown implants, with a lower rate for bone loss.

DISCUSSIONS

Although the longest observation period was of 3 years, the mean observation was of only 2 years, due to the fact that many implants were inserted close to the final of the study. The total number of measurements was of 5700. The inter-wire distance of 0.6 mm and the lack of wire blurring were the main indicators for the radiographic assessment. The distance from the junction of the appliance and the bone level was evaluated closely to 0.1 mm. Even if a precision lower than 0.5 mm could not be obtained, the high number of implants leads to a mean incertitude lower than ±0.5 mm. The reproducibility of intra-examination was very high and and independent observer examined all the radiographs.

The bone loss was 0.98 mm, revealing a stabile situation. An osseous gain was observed (around 14.57%), possibly explained by a high mineralization, leading to a high radio-opacity. Our results regarding the bone loss are similar to other recent studies that reported a bone loss of 0.7 mm [11]. The evaluation of an annual rate of bone loss in time is more important than the evaluation of the mean bone loss, offering information for the future functionality of the implant [12, 13, 14]. The 15 mm implants presented a higher bone loss than the shorter ones (of 7 mm), but without a statistic significance. These data are similar to other studies that also observed a high rate in time of bone loss for longer implants.

A significant difference was observed between the sites with and without membrane and/or bone graft, with a better performance for implants with bone graft and/or membrane. The osseous resorbtion was higher for ceramic-fused-to-metal; the resistance of such restoration could explain this fact. The small interference points need more time for maxilla functionality to adapt to in case of ceramic-fused-to-metal prostheses [2, 15, 16].

The single crown implants are definitely not inferior and we could not find any difference between the restoration types but the methods needs further studying.

CONCLUSIONS

The implants with single crowns or with prosthetic bridges in the maxilla and mandible, in the anterior and posterior sites present a good prognosis in time, regarding the bone loss progression. The bone loss was observed in cases with bone dehiscence or with ceramic-fused-to-metal restorations. There was a significant difference between the maxilla and mandible implants in the first 6 months. We could not find any significant difference between the implants inserted in the anterior area of the dental arch and the posterior area.

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SEVERE PERIODONTAL IMPAIRMENT IN SYSTEMIC CONDITIONS: A CASE REPORT

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ABSTRACT

Aggressive forms of periodontitis are defined by rapid localized or generalized loss of the supportive periodontal structures, occurring in familial groups in otherwise medically healthy subjects Aggressive periodontitis consists in disease different phenotypes of plurifactorial etiology that appear as a result of complexe interactions between specific genes of the host and environment. The interactions between the disease process and the modifying factors (stress, smoking habit) are considered to influence the specific manifestations of the disease. We present the case of a patient with localized aggressive periodontitis, with a late interception, in a context of stress, chronic smoking and inadequate oral hygiene and diet as a background. Smoking, stress and a poor oral hygiene are definetively risk factors that enhance the phenotypic manifestations of the periodontal disease with an aggressive character. Therefore, such aspects must be considered in the diagnostic, prognostic and therapy of the periodontal disease.

Key words: aggressive periodontitis, stress, cigarette smoking

INTRODUCTION

Aggressive periodontitis consists in disease different phenotypes of plurifactorial etiology that appear as a result of complexe interactions between specific genes of the host and environment. The hereditary character of the susceptibility to aggressive periodontitis is insufficient for the disease to appear and to evolve: the exposure to potential pathogens with specific virulence factors represents an essential step. The incapacity of the host to deal with the bacterial aggression and to avoid infl ammatory tissue damage results in the initiation of the disease process. Interactions between the disease process and environmental (e.g. stress and cigarette smoking) factors are thought to contribute to determining the specific clinical manifestation of the disease.

The mechanisms by which psychosocial stress may affect the periodontal status are complex. It has been suggested that one of the plausible pathways may involve behavioral changes leading to smoking and poor oral hygiene [1]. Numerous studies have assessed the relationship between stress and periodontal disease. Linden et al. [2] evaluated the association between occupational stress and the progression of periodontitis and reported that longitudinal attachment loss was significantly predicted by

increasing age, lower socioeconomic status, lower job satisfaction and type A personality (characterized by aggressive, impatient and irritable behavior). In a recent study, Breivik et al. [3] demonstrated that experimentally induced depression in rats accelerated tissue breakdown in a ligature periodontitis model and that pharmacologic treatment of depression attenuated this breakdown.

Cigarette smoke is a very complex mixture of substances with over 4000 known constituents. These include carbon monoxide, hydrogen cyanide, reactive oxidizing radicals, a high number of carcinogens, and the main psychoactive and addictive molecule – nicotine [4]. Nicotine is absorbed rapidly in the lung. The administration of nicotine causes a rise in the blood pressure, an increase in heart rate, an increase in respiratory rate, and decreased skin temperature due to peripheral vasoconstriction. However, at other body sites, such as skeletal muscle, nicotine produces vasodilatation.

An analysis of the data from NHANES III study concluded that smokers have a risk four times higher than non-smokers [5]. The informations suggest a dose-effect relation between the number of cigarettes smoked per day and the susceptibility to periodontitis. The study estimated that more than 40% of the periodental disease in adult cases are enhanced by current smoking habit. Clinically relevant, smoking interferes with the healing after rooth planing and curettage [6,7,8], post-surgical healing [9, 10, 11, 12] and healing after guided osseous regeneration procedures [13]. The mechanisms for the adverse effects induced by cigarette smoking are stated but the molecular patways remain to be discovered [14,15]. Smoking represents, withous a doubt, a risk factor for the majority of the inflammatory periodontal diseases.

CASE REPORT

A patient (T.N.), 41 years old, with a base occupation of medical assistant, presents for dental treatment, acusing a high dental mobility (tooth 2.2) and moderate mobility (sextant V), multiple recessions and carious lesions (2.8, 3.7).

The diagnosis was based on the anamnesis informations (systemic diseases questionnaire), local clinical examination with imagistic assessment (photographs, intraoral camera) and paraclinical evaluation (imagistic: panoramic radiograph and laboratory analysis chart).

From the discussions with the patients we obtained the following data: the patient is a heavy smoker (2 packs/day, for more than 20 years); he worked abroad for a long time (mostly in improper conditions), a period of time characterized by environmental and psychosocial stress, inadequate diet and inconstant oral hygiene measures. Momentarily , he is still under working stress.

After the intraoral clinical examination (Fig.1,2) we observed the following aspects:

Maxilla:

- Cervical carious lesions 1.4, 1.5 and sextant II; 2.8-class II carious lesion
- Diastema, trema
- Multiple recessions, II and III Miller class
- Slight bleeding (degree 1-2)

Mandible:

- Class II Kennedy edentulous bridge with 2 modifications (narrowed edentulous space in IVth quadrant)
- Cervical carious lesions 3.7, 4.4, 4.5
- Class II and III multiple recessions
- High probing depths (Fig.3)
- Moderate bleeding (degree 2-3).

The radiologic examination revealed deep infrabony pockets, suggesting a localized form of aggressive periodontitis (previously known as juvenile periodontitis), with vertical osseous defects (Fig.4).

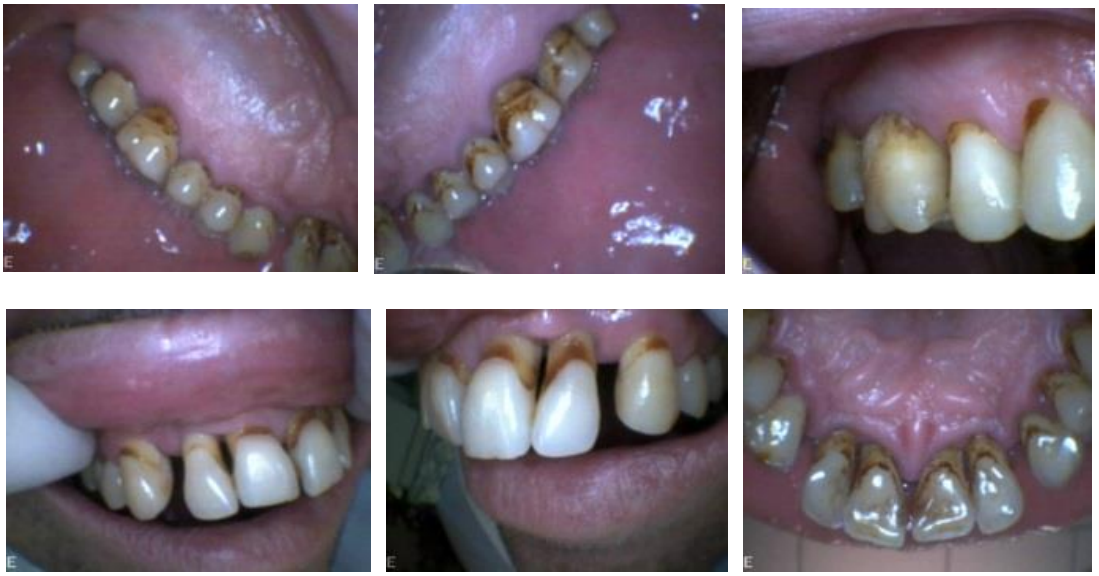

Figure 1. Intraoral examination –initial aspect maxilla

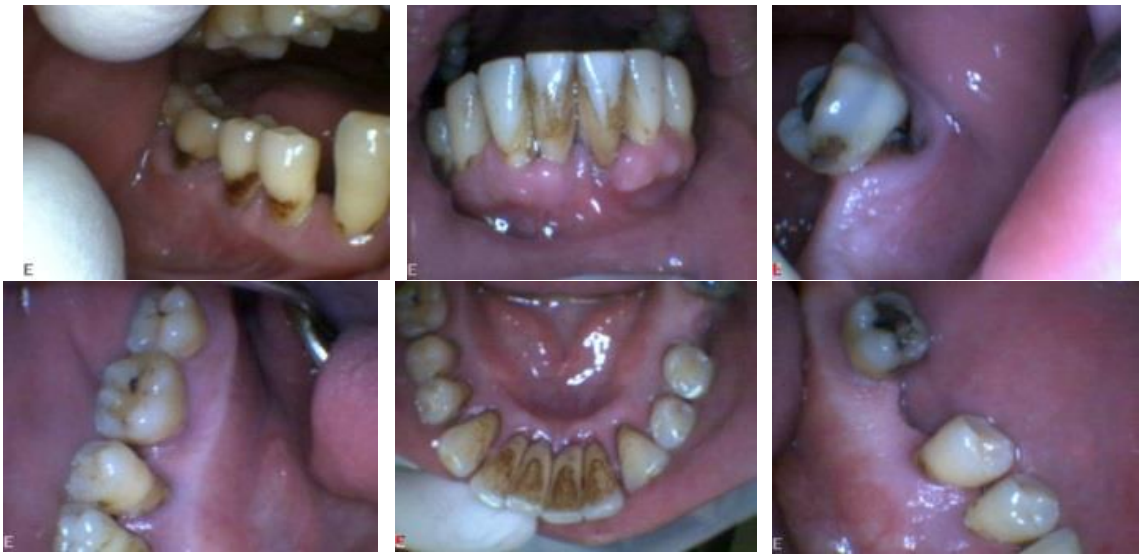

Figure 2. Intraoral examination –initial aspect mandible

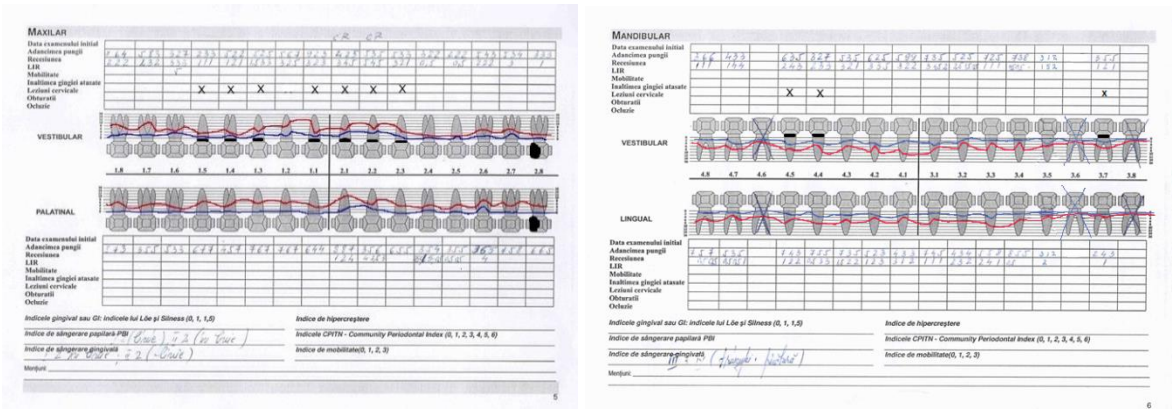

Figure 3. Maxillary and mandibulary periodontograms

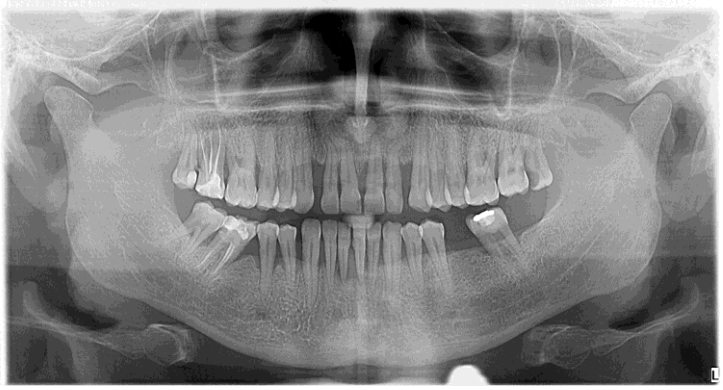

Figure 4. Radiologic examination (panoramic radiograph)

On the first dental visit we conducted the following measures:

- a rigurous clinical examination
- supragingival scaling – mixed technique (manually and mechanically - ultrasounds)
- the periodontograms
- we collected venous blood to assess the neutrophils function
- collection from 2.2, 4.1, 4.4-4.5 situses with micro-ident kit
- biochemical blood testing (haemoleucogram, lipidic profile, glycemia, glycosylated hemoglobin).

The laboratory examination revealed dyslipidemia (that can be included in smoking context) and a high glycemia (fig.5).

Data recoltare: 30/01/2013 Data rezultat: 31/01/2013 — Cerere Acceptata Ora recoltarii/prezentarii: 8:57/8:57
Nume: TRIFAN NICULAI — C.N.P.: 1711226330778 Sex: B Varsta: 41 ani
Adresa: — Operator: ASISTENT
Trimis de: Dr. — Punct de recoltare: Intern
Institutia:

Denumire analiza	Rezultat	Unitate de masura	Valori biologice de referinta
.HEMATOLOGIE (SINGE INTEGRAL) MEDONIC CA 620			
VSH *	10	mm la 1 ora	1 - 10

Analizele pentru .hematologie (singe integral) medonic ca 620 au fost lucrate de:

BIOCHIMIE SERICA (SER)	**A25 BIOSYSTEMS**		
Hemoglobina glicozilata (Hb A1c)	4.87		4% - 7%
Glicemie * !	123	mg/dL	70 - 115
Colesterol total *	191	mg/dL	110 - 200
Trigliceride * !	385	mg/dL	50 - 150
HDL Colesterol *	51.4	mg/dL	35 - 79
LDL Colesterol	70	mg/dL	70 - 130
TGO(AST) *	26	U/L	2 - 40
TGP(ALT) *	38	U/L	2 - 41
Uree * !	59	mg/dL	15 - 40
Creatinina serica *	0.82	mg/dL	0.7 - 1.3
Acid uric seric*	5.64	mg/dL	2.6 - 7.2

Figure 5. Laboratory examination results

qPCR test revealed in direct culture Fusobacterium nucleatum and Porphyromonas gingivalis.

On the second dental visit we conducted the following measures:

- Subgingival scaling
- Root planing
- Curettage without surgical access
- Systemic antibiotherapy: Metronidazol 250mg at 8 hours, 7 days, Ciprinol 500mg at 12 hours, 10 days
- Oral hygiene measures correction
- Recommandation for Parodontax toothpaste, dental brush of soft or

ultrasoft type and additional oral hygiene products (interdental brush, oral rinses with mouthwash: non-alcoholic solution of chlorhexine digluconate – Parodontax for two weeks)

- Dental immobilization on sextant V with splint and composite
- Selective polishing.

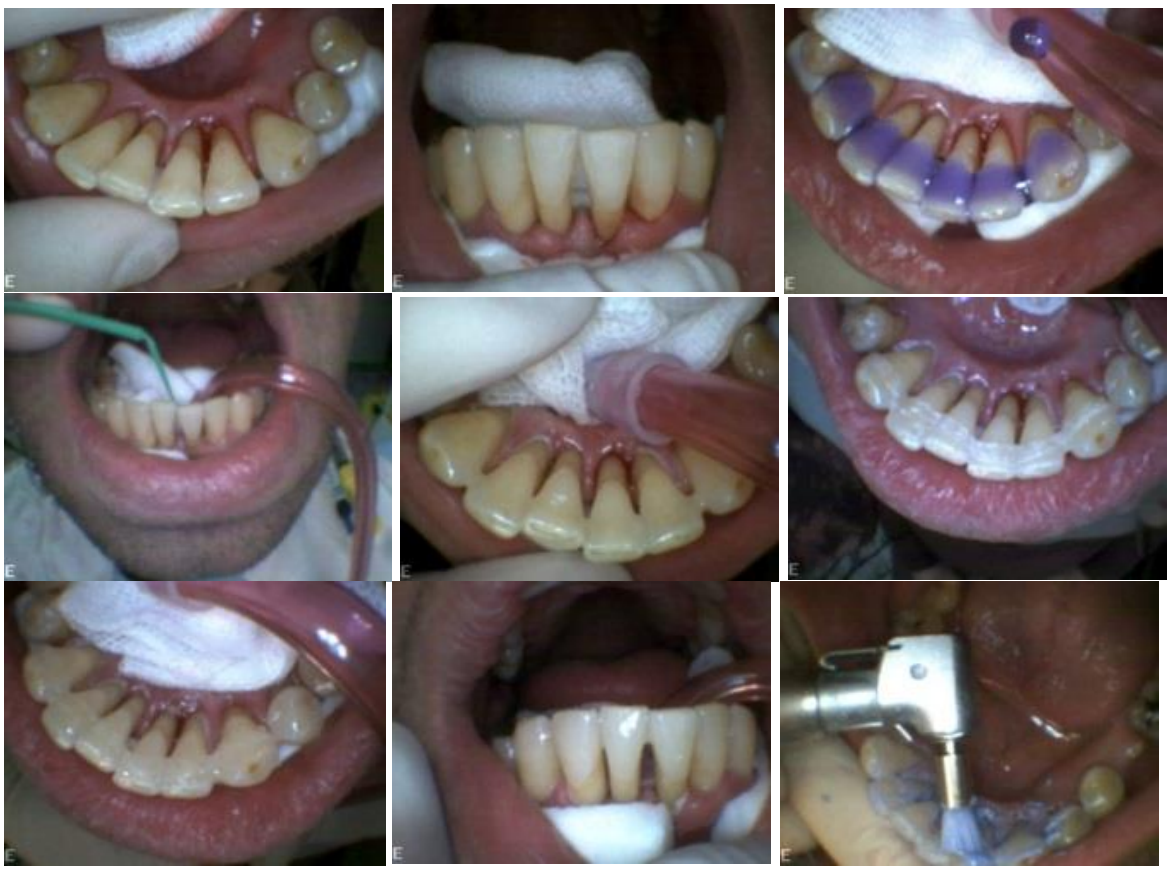

Figure 6. Dental immobilization steps (sextant V)

After one month we observed the decreasing of the probing depths and of the dental mobility. We conducted the treatment for the carious lesions on teeth 1.4, 1.5, sextant ii, 4.4 and 4.5 with compomers; tooth 3.7 received a temporary obturation with glassionomers.

Because the dental mobility was still present of the tooth 2.2, we decided for a dental immobilization on the maxillary teeth too.

Due to the difficult mobility of the patient (he still works abroad), the following evaluation will be conducted after 3 months. For that session we proposed, with the patient agreement, to treat the edentulous space in the iiird quadrant, to extract tooth 2.8 and to begin an interdisciplinary therapy for smoking cessation, therefore reducing a major risk factor for the periodontal disease.

DISCUSSIONS

Aggressive forms of periodontitis are defined by rapid localized or generalized loss of the supportive periodontal structures, occuring in familial groups in otherwise medically healthy subjects [16]. Aggressive forms can affect the primary or permanent dentition. Typically, susceptible patients are less than 30 years old at disease onset [17]. The similar phenotypes of aggressive periodontal disease are probably the clinical expression of multiple disease forms with discrete etiologies [18].

The reported prevalence of early-onset aggressive periodontitis varies from study to study. The comparability of the data is affected by the somewhat ambiguous disease definitions and the various diagnostic techniques used. A review concluded that aggressive forms of periodontitis have a low prevalence in most regions of the world, occurring in 0.1–1.0% of the population [19].

Although earlier reports by saxen [20] showed a female majority among subjects with early-onset aggressive periodontitis, a more recent study conducted in the usa did not confirm this observation [21]. Furthermore, based on the results of a genetic segregation analysis performed in 100 families, the aggressive disease has an autosomal dominant inheritance pattern [22]. This contrasts with the autosomal recessive inheritance pattern identified in northern europe [23], suggesting different pathways to disease for each of the two populations.

Many of the smoke components could modify the host response in periodontitis. Cigarette smoking represents the second most important risk factor for the periodontal disease, after a poor oral hygiene. Depending on the period of exposure to cigarette smoking, daily number of cigarettes and periodontal status, one of the main treatment measures consists in smoking cessation counseling. In the case of a heavy smoker, professional programs in which he can be included might represent a necessity.

CONCLUSIONS

Smoking and psychosocial stress must be addressed in the diagnostic, prognostic and periodontal treatment. Cigarette smoking represents a predictive factor in the activity and evolution of the periodontal disease and smoking cessation is an important part of the therapy plan.

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RESEARCHES REGARDING THE PROFILE OF THE FINISHED SURFACES OF SOME DIRECT LIGHT CURED COMPOSITE MATERIALS

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ABSTRACT

Introduction. The composite resins are the most commonly used materials in dentistry. In recent years, researchers have turned their interest to the studies on quality parameters of dental biomaterials. **Goal.** The investigations on surface quality aimed at highlighting roughness variations corresponding to the samples of various direct coronary restorative materials whose finishing was achieved by mechanical polishing. **Material and method.** For this research we used 3 light-curing composite materials of nanohybrid type (Herculite, Synergy D6 and Brilliant). Specimens were made in the laboratory of Dental Materials within the Faculty of Dental Medicine, "Gr. T. Popa" University of Medicine and Pharmacy of Iaşi. The surfaces finished by polishing were subjected to imaging tests and experimental measurements at nanoscale by using Nanosurf Easy Scan 2 AFM atomic force microscopy system. **Results and discussion**. The experimental researches carried out to determine the nanometer profile of each surface revealed the 3D image of the topography obtained after finishing by polishing, the nanometric profile of the midline corresponding to the investigated area, the 2D image obtained by deflection of the analysed surface. **Conclusions**. The determination of nanometric profile of surfaces through investigations carried out by atomic force microscopy (AFM) is a way of highlighting the microrelief topography resulted at the end of finishing by polishing. After polishing with abrasive gums, the nanometric profile having the smallest size (268.3nm) was obtained for Brilliant material. After having analyzed the dispersion of the values of total size of the nanometric profile for the three direct coronal restorative materials under study, we may notice that dispersion intervals have close limits, the lowest interval being characteristic to the surfaces obtained with Herculite and Brilliant commercial products.

Key words: composite materials, dental materials, roughness, surface quality

INTRODUCTION

The composite resins are the most commonly materials used in dental medicine. The term "composite" refers to the fact that a material consists of several components, so it has at least two different phases (e.g. monomer and filler). In a narrower sense, the term "composite" generally refers to diacrylic composite resins [1,2,3].

Modern dental composites are a mixture of resin and additional particles (additives) whose handling characteristics are determined

by the particle size and the polymerization method. Most composites are of hybrid type - consisting of microfine particles (submicronic) and conventional - designed to optimize both the mechanical properties and the surface properties. They contain additives in proportion of 75-85% of their weight and they have the highest wear resistance [2,3].

In recent years, researchers have turned their interest to the improvement of biocompatibility through different superficial treatments and to the studies on quality parameters of dental biomaterials [4].

In this context, the surface parameters and adhesion of microorganisms to dental materials are important issues that can be analyzed by clinical and laboratory studies [5,6]

GOAL

The investigations on surface quality aimed at highlighting roughness variations corresponding specimens of various restorative materials direct coronary whose finishing was achieved by mechanical polishing..

MATERIAL AND METHODS

Experimental researches concerning the surface quality were performed on 3 direct coronary restorative light-curing composite materials of nanohybrid type (Herculite, Synergy D6 and Brilliant) presented in table 1.

Table 1. The materials used in the experimental research

Representative class	Commercial product	Manufacturer
Light-curing composite diacrylic resins	Herculite	Kerr
	Synergy D6	Coltene Whaledent
	Brilliant	Coltene Whaledent

The specimens were made in the laboratory of Dental Materials, Faculty of Dental Medicine – "Gr. T. Popa" U.M.F. Iaşi. Each specimen was prepared according to the manufacturer's instructions, being 10 × 10 mm in diameter and 4 mm thick. Curing composites were condensed into a plastic conformator, in 2 mm layers, each layer being cured for 30 seconds (fig. 1, fig. 2).

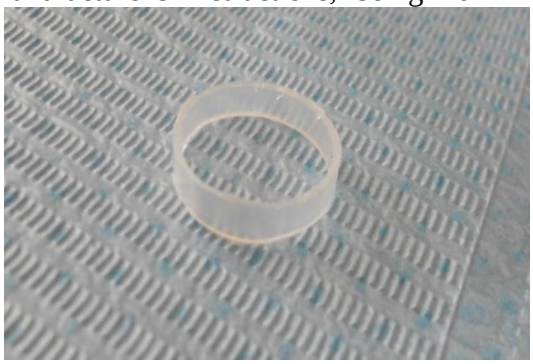

Figure 1. Plastic conformator

Figure 2. Curing light

In the next stage, the veneer of each sample was finished and then mechanically polished at the clinical base of dental teaching - "Gr.T.Popa" UMF Iaşi. Mechanical polishing with abrasive gums was performed with counter-angle part adapted to the dental unit equipped with a control system of the rotational speeds of up to 30,000 rot / min for

60 seconds for each sample (fig. 3).

Strongly abrasive gummed discs have diamond particles embedded while fine and ultrafine gums for finishing and polishing do not have abrasive particles in their structure (Table 2).

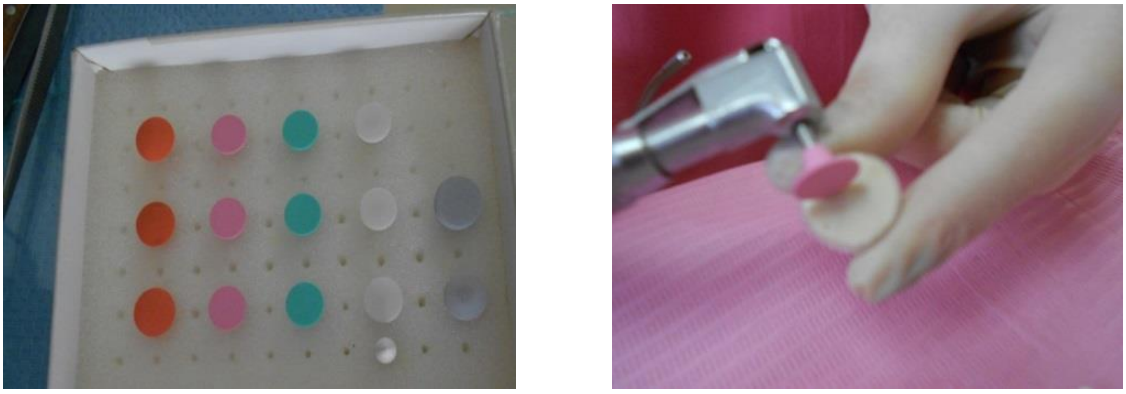

Figure 3. Mechanical polishing of samples

Table 2. Materials used for mechanical polishing

Representative class	Commercial product	Abrasive materials
Light-curing composite diacrylic resins	Herculite	Gray gummed disc for strong polishing White gums for rough polishing Green gums for regular polishing Pink gums for ultrafine polishing Orange gums for fine polishing

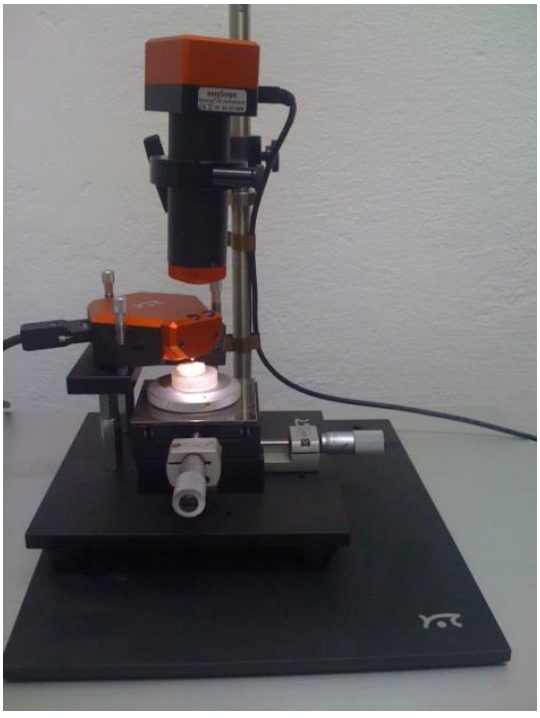

Figure 4. EasyScan 2 AFM system [6]

The surfaces finished by polishing were investigated by means of imaging analysis and experimental measurements at nanometric scale by using Nanosurf Easy Scan 2 AFM atomic force microscopy system from the Material Engineering laboratory of the Faculty of Material Science and Engineering from "Gheorghe Asachi" Technical University of Iaşi (fig. 4).

RESULTS AND DISCUSSIONS

The experimental researches carried out to determine the nanometric profile of each surface revealed the following aspects:

- 3D image of the relief topography obtained after finishing by polishing;
- nanometric profile of the midline corresponding to the investigated area;
- 2D image of the surface treated obtained by deflection;

The aspects concerning the 3D topography

and 2D image obtained by deflection (amplitude of cantilever's vibration) at the level of each finished surface by polishing are shown in fig.5, fig.6, fig.7.

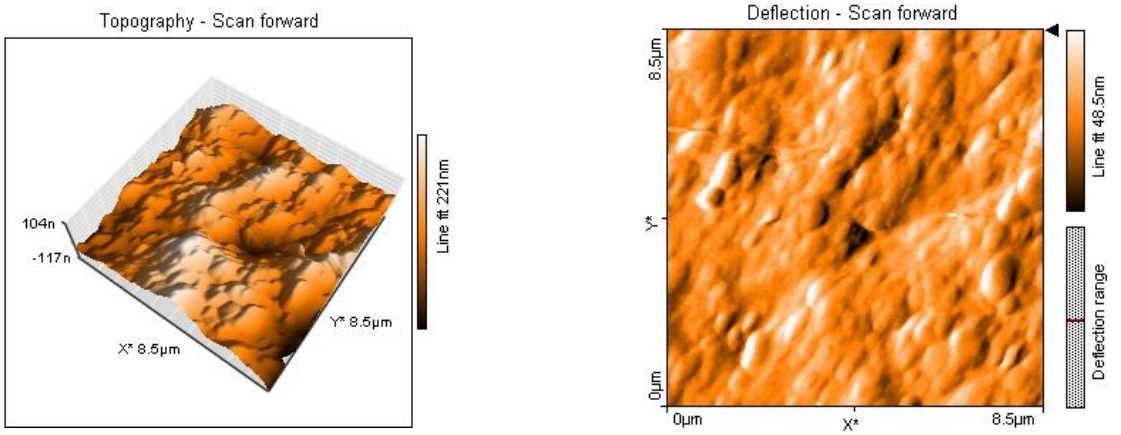

Figure 5. The topography of polished surfaces for Herculite specimen.
a – 3D images (topography); b – 2D images (deflection)

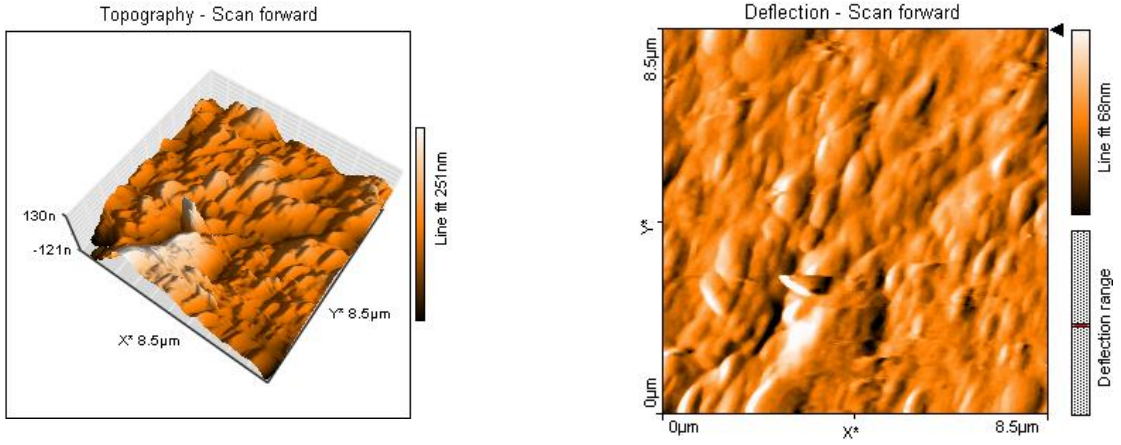

Figure 6. The topography of polished surfaces for Synergy D6 specimen.
a – 3D images (topography); b – 2D images (deflection)

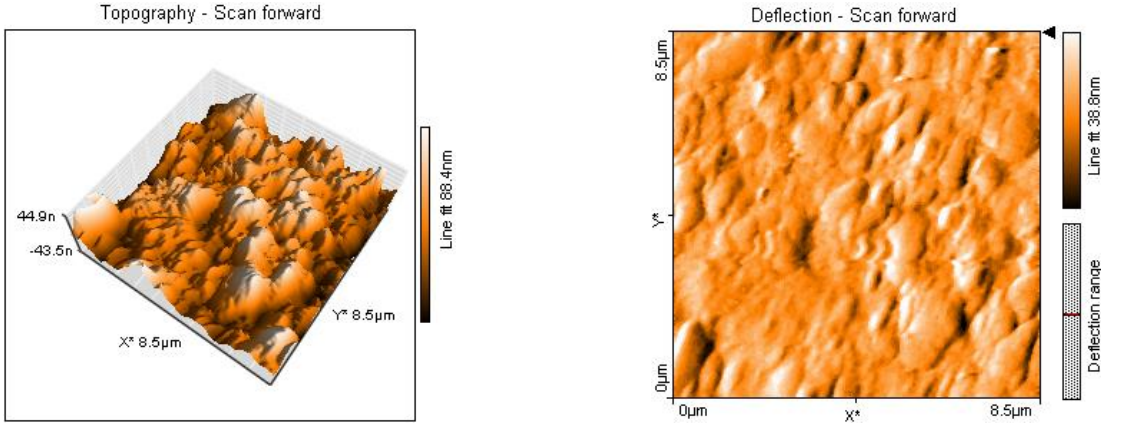

Figure 7. The topography of polished surfaces for Synergy D6 specimen.
a – 3D images (topography); b – 2D images (deflection)

3D images of the finished surfaces of specimens from the selected materials

provide information on the way in which the profile of microscopic irregularities was generated, the degree of dimensional uniformity and regularity in terms of arrangement of the formative elements.

The shape of nanoscale surface topography shows that the relief obtained by mechanical polishing methods is generated by the sliding of the material from top to bottom, the sliding surfaces being represented by the lateral flanks of each microscopic irregularity. In this way, we get the uniformity of the total size of profile. As for the dimensional shares of each analysed specimen, the results of measurements are presented in table 3.

A summary of the average values of total size for the nanometric profile corresponding to the polished surfaces is shown in table 4.

Table 3. Nanometric profile dimensions of the surfaces finished by polishing

No	Representative class	Commercial product	Experiment code	Dimensional shares, [nm]		Total size, [nm]
				minimum	maximum	
1	Light-curing composite diacrylic resins	Herculite	61	-117	+104	221
2			62	-157	+174	331
3			63	-147	+123	270
4		Synergy D6	71	-131	+113	244
5			72	-121	+130	251
6			73	-246	+301	547
7		Brilliant	81	-261	+258	519
8			82	-98.4	+99.3	197.7
9			83	-43.5	+44.9	88.4

Note: total size = | minimum size | + | maximum size |

Table 4. Summary of the average values of total size for the nanometric profile

No.	Representative class	Commercial product	Total size, [nm]
1	Light-curing composite diacrylic resins	Herculite	274
2		Synergy D6	347.3
3		Brilliant	268.3

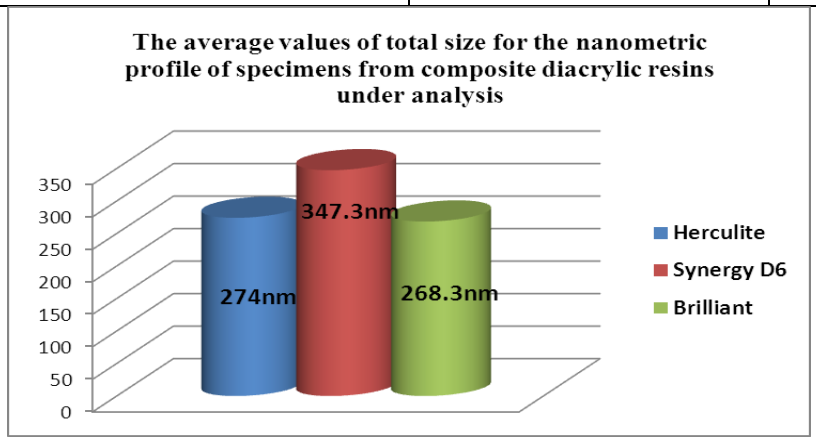

Figure 8. The average values of total size for the nanometric profile of specimens from composite diacrylic resins under analysis

In terms of dimensions of the nanometric profile resulted after mechanical polishing, we may notice that the lowest values were obtained for Brilliant specimen (Fig. 8).

CONCLUSIONS

The determination of nanometric profile of surfaces through investigations carried out by atomic force microscopy (AFM) is a way of highlighting the microrelief topography resulted at the end of finishing by polishing.

Nanoscale topography confirms that the final profile of mechanically polished surfaces is the result of plastic deformations by sliding which lead to micrometric displacements of material from the top to the bottom of their irregularities.

Standardizing of total size for the nanometric profile of mechanically polished surfaces will result from the flattening of microscopic irregularities by successive sliding of material in the lateral flanks of the original grooves.

After polishing with abrasive gums, the nanometric profile with the smallest size (268.3nm) was obtained for Brilliant material.

After having analyzed the dispersion of the total size values of the nanometric profile for the three direct coronal restorative materials under study, we may see that the dispersion intervals have close limits, the closest interval being characteristic to the surfaces obtained with Herculite and Brilliant commercial products.

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ORAL CHANGES IN PATIENTS WITH CHRONIC RENAL FAILURE

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ABSTRACT

Aim: To make comparative evaluation of objective oral clinical findings and subjective oral symptoms in patients with chronic renal failure (CRF) undergoing various therapeutic treatments, and to find possible link between subjective symptoms and objective clinical findings. **Material and methods:** We examined 90 patients with chronic renal failure divided into three groups: patients with CRF undergoing hemodialysis, patients with CRF without hemodialysis and serum creatinine <120μmol / L and patients with renal transplantation. Swab for Candida Albicans was taken from the oral mucosa. Oral changes were followed on the entire mucosal surface of the oral cavity and were classified into subjective and objective findings. **Results:** Certain oral changes showed a predisposition to a particular group of patients, such as petechiae and ecchymoses in the dialysis group and gingival enlargement in transplant group. Coated tongue, thirst, pale oral mucosa and dry fissured lips were the most frequent oral symptoms and changes among all CRF patients independently in which group they have belonged. Significant association was found between xerostomia and coated tongue and between unpleasant taste and coated tongue in all studied patients. **Conclusion:** The stadium and consequently severity of chronic renal disease as well as the type of treatment have influence on the severity of the oral clinical finding.

Key words: chronic renal failure, oral changes, dialysis, renal transplantation

INTRODUCTION

Chronic renal disease represents an important worldwide health problem with a tendency for annual progression (9), and diabetic nephropathy is considered for the most common cause of end stage of renal disease (ESRD).The patients due to residual renal function and adaptation mechanisms of glomerular filtration rate may pass through a long asymptomatic period. But with progression of renal disease through 5 stages and finally to irreversible bilateral renal destruction comes to an increased occurrence of morbidities associated with this condition and rich symptomatology due affection of many organs and organ systems. Under such circumstances there are also repercussions in the oral cavity.

Approximately 90 % of all affected patients (28) have oral manifestations that originate from soft tissues, jaw bones and salivary glands. Witch of the systemic complications and oral changes will appear in patients with chronic renal failure depends not only on the etiological factors , but also of the type of therapy that they receive, ranging from usual measures of dietary restriction (13,27), various forms of dialysis, and finally to renal transplantation (4,30). Despite

advantages of the renal replacement therapy, some oral abnormalities as uremic odor, xerostomia, unpleasant taste and mucosal pain are irreversible and further persist although the adequate medical treatment.

The aims of our study were to make comparative evaluation of objective oral clinical findings and subjective oral symptoms in patients with chronic renal failure undergoing various therapeutic treatments, and to find possible link between subjective symptoms and objective clinical findings.

MATERIAL AND METHODS

A total of 90 patients in whom chronic renal failure was diagnosed were included in this study. Selection of the patients was made at the University Nephrology Department in Skopje, and the eponymous hemodialysis center. Complete anamnestic procedure and clinical examination were performed at the University Department of Oral Medicine and Periodontology, and laboratory investigations were implemented at the Institute for Microbiology, Medical Faculty in Skopje.

All participants included in this study were divided into three groups:

- The first group (group A) consisted of 30 patients with chronic renal failure and serum creatinine level less than 120 μmol/L.
- The second group (group B) consisted of 30 patients with chronic renal failure undergoing hemodialysis.
- The third group (group C) consisted of 30 patients with renal transplantation.

All patients regardless of which group belonged were from both sexes, aged 18 to 65 years. In patients undergoing hemodialysis, the treatment was performed three times a week in duration of three hours per session. Patients with renal transplantation in their main therapy were receiving Cyclosporine in a daily dosage of 125 mg. (Neoral; 6 - 8mg/kg).

All subjects were informed about the procedure and agreed to participate in the study. For all patients included in the study were noted information about their oral health status from the anamnesis and clinical examination. Oral changes were followed on the entire mucosal surface of the oral cavity and were classified into subjective and objective findings.

Through anamnestic data were recorded the most common subjective oral symptoms and signs as follows: uremic fetor, unpleasant taste, thirst, xerostomia and burning tongue.

Uremic fetor was recorded as a urine-odor breath, and unpleasant taste as loss of sensation of different tastes in food. Diagnosis of xerostomia was made when the patients reported dry mouth and during oral inspection dental instrument was sticking to the oral mucosa.

Oral lesions were registered according to acknowledged clinical diagnostic criteria (2, 27).

Dry and fissured lips were recorded when smaller or larger squamous formations on mildly erythematous vermilion surface were observed. Coated tongue was recorded as dirty white plaque formations on the dorsal surface which could be easily removed and also elongated filiform papillae were present. Uremic stomatitis was registered as a form of irregular easily erythematosus areas covered with grayish white pseudomembranes localized on lateral borders and dorsum of the tongue or buccal mucosa, accompanied with painful sensations. Gingival enlargement was observed in the region of marginal gingival and interdentally papilla.

Detection of Candida Albicans

From each patient using a swab stick with rotational movements was taken the material from oral mucosa, placed in a sterile tube within 2 hours was distributed to the Institute

of Microbiology where it was cultivated on Sabouraud agar or selective agar surface. The sample was kept 48-72 hours until determination of the results.

Statistical analysis

The obtained data were presented as percentages of total and were statistically processed using the program Statistica 7.1. We used Kruskall-Wallis-test to assess the significance of differences in distribution of oral lesions and symptoms among all studied groups. The degree of difference between two groups was assessed using Mann-Whitney U test. Intra-group association between oral symptoms and oral lesions was examined using Wilcoxon Signed Rank test.

RESULTS

Table 1. Oral symptoms and signs in study groups

	Group A		Group B		Group C				
Oral symptoms and signs	Cases	**%**	Cases	**%**	Cases	**%**	p(a:b)	p(a:c)	p(b:c)
Uremic fetor	8	26,66	17	56,66	9	30	**0,019**	0,576	0,072
Unpleasant taste	8	26,66	10	33,33	9	30	0,576	0,713	0,851
Thirst	23	76,66	24	80	18	60	0,756	0,227	0,132
Xerostomia	22	73,33	20	66,66	12	40	0,501	0,079	**0,040**
Burning toungue	0	0	9	30	2	6,66	**0,001**	0,154	**0,021**

Statistically significant differences was found in the distribution of uremic fetor (Z = 2.337, p = 0.019) and subjective feeling of burning tongue (Z = 3.227, p = 0.001) between patients with CRF in pre-dialysis stadium and patients with CRF undergoing hemodialysis.

There was no statistically significant difference in the prevalence of xerostomia (Z = 2.053, p = 0.040) and burning tongue (Z = 2.316, p = 0.021) between hemodialysis patients and renal transplant patients.

Statistically significant difference has not been found in the prevalence of unpleasant taste (X2 = 0.322, df = 2, p = 0.851) and subjective feeling of thirst (X2 = 2.680, df = 2, p = 0.262) among the different groups of patients.

Table 2. Oral lesions in study groups

	Group A		Group B		Group C				
Oral lesions	Cases	%	Cases	%	Cases	%	p(a:b)	p(a:c)	p(b:c)
Pale oral mucosa	16	53,33	25	83,33	23	76,66	**0,013**	0,060	0,522
Dry fissured lips	22	73,33	27	90	8	26,66	0,098	**0,000**	**0,000**
Coated tongue	23	76,66	30	100	24	80	**0,005**	0,756	**0,010**
Candidiasis	0	0	3	10	0	0	**0,013**		
Petechiae or ecchymoses	0	0	27	90	4	13,33	**0,000**	**0,040**	**0,000**
Uremic stomatitis	0	0	4	13,33	4	13,33	**0,040**	**0,040**	1,000
Erythema	23	76,66	20	66,66	12	40	0,394	**0,004**	**0,040**
Angular cheilitis	14	46,66	19	63,33	6	20	0,198	**0,030**	**0,001**
Gingival enlargement	0	0	0	0	14	46,66	**0,001**		

We observed statistically significant difference in the prevalence of pale mucosa (Z = 2.477, p = 0.013), coated tongue (Z = 2.791, p = 0.005), petechiae and/or ecchymoses (Z = 6.948, p = 0.000) and uremic stomatitis (Z = 2.053, p = 0.040) between pre-dialysis patients and hemodialysis patients.

Between pre-dialysis patients and renal transplant patients we observed statistically significant difference in the prevalence of dry, fissured lips (Z = 3.585, p = 0.000), and petechiae and/or ecchymoses (Z = 2.053, p = 0.040), uremic stomatitis (Z = 2.053, p = 0.040), erythema (Z = 2.856, p = 0.004) and angular cheilitis (Z = 2.173, p = 0.030).

Between hemodialysis patients and renal transplant patients we observed statistically significant difference in the prevalence of xerostomia (Z = 4.934, p = 0.000), coated tongue (Z = 2.560, r = 0.010), petechiae and/or ecchymoses (Z = 5.892, p = 0.000), erythema (Z = 2.053, r = 0.040) and angular cheilitis (Z = 3.376, p = 0.001).

The Kruskal -Wallis test showed statistically significant difference in the prevalence of gingival enlargement and candidiasis (x^2 = 11,09 ; df= 2; p< 0,01) among all studied groups.

Table 3. Intra-group associations between oral symptoms, signs and oral lesions in all study groups

Group A	Symptoms, signs	Oral lesions	Wilcoxon Signed Ranks Test	p
	Uremic fetor	Uremic stomatitis	Z=1,897	0,058
	Unpleasant taste	Saburral tongue	Z=3,873	**0,000**
	Thirst	Dry fissured lips	Z=1,732	0,083
	Xerostomia	Saburral tongue	Z=2,714	**0,007**
	Xerostomia	Angular cheilitis	Z=1,871	0,061
	Xerostomia	Erythema	Z=2,714	**0,007**
	Burning tongue	Uremic stomatitis	Z=0,000	1,000
Group B	Uremic fetor	Uremic stomatitis	Z=3,606	**0,000**
	Unpleasant taste	Saburral tongue	Z=4,472	**0,000**
	Thirst	Dry fissured lips	Z=2,01	**0,005**
	Xerostomia	Saburral tongue	Z=3,276	**0,001**
	Xerostomia	Angular cheilitis	Z=0,180	0,857
	Xerostomia	Erythema	Z=0,474	0,635
	Burning tongue	Uremic stomatitis	Z=1,667	0,096
Group C	Uremic fetor	Uremic stomatitis	Z=2,828	**0,005**
	Unpleasant taste	Saburral tongue	Z=3,128	**0,002**
	Thirst	Dry fissured lips	Z=2,500	**0,012**
	Xerostomia	Saburral tongue	Z=2,558	**0,011**
	Xerostomia	Angular cheilitis	Z=2,449	**0,014**
	Xerostomia	Erythema	Z=0,000	1,000

In the group of pre-dialysis patients we found a significant association between following subjective and objective clinical oral findings: unpleasant taste and coated tongue, xerostomia and coated tongue, xerostomia and erythema.

In the group of hemodialysis patients we found a significant association between:

uremic fetor and uremic stomatitis, unpleasant taste and coated tongue, thirst and dry fissured lips, xerostomia and coated tongue.

In the group of renal transplant patients we found a significant association between: uremic fetor and uremic stomatitis, unpleasant taste and coated tongue, thirst and dry fissured lips, xerostomia and coated tongue, xerostomia and angular cheilitis.

DISCUSSION

To our knowledge this is the first study in Macedonia in this field, investigating oral manifestations in CRF patients undergoing different therapy. Based on the findings from this study as we expected the highest prevalence of oral symptoms and lesions was recorded in hemodialysis patients and the lowest percentage was recorded in renal transplant patients. We believe this result came out because hemodialysis patients are not very suitable for routine dental treatment, their dependence on dialysis centers and also because of their lack of motivation and less priority to maintain oral health contrary to the severity of their primary disease. On the other hand, transplant patients are aware that maintaining oral health at high level is necessary to prevent oral infections which can jeopardize the success of the transplantation, but nevertheless certain oral manifestations occur as a side effect of post-transplantation immunosuppressive therapy.

In our study most frequent oral symptom among patients from each group was subjective feeling of thirst, symptom present in 65 out of 90 patients (72, 22 %). After thirst, followed xerostomia and uremic fetor, which is consistent with findings in other studies (5, 6, 14, 17, 21, 22) We think that thirst in hemodialysis patients appears as a result from the fluid restriction implemented in order to prevent fluid overload between dialysis sessions, and as a consequence of present hyposalivation. The reason for the presence of thirst in renal transplant patients we believe that has a complex nature and predominantly role plays the synergistic side effect of immunosuppressive and corticosteroid therapy that these patients receive. After thirst as second most frequent oral symptom in all renal patients in our study occur xerostomia, present in 54% out of 90 patients. Some higher rates has recorded Junn-Ming-Sung (14) in his study where xerostomia was present among 68, 9% of 90 hemodialysis patients. According to Hamid (10) xerostomia is common among patients with chronic renal failure. The patients included in this study despite their main therapy also receive ACE- inhibitors, antidepressants and sedatives. This additional medical therapy worsens the situation and we believe that is most responsible for the present oral dryness (xerostomia) as a side effect. In our study we found an association between xerostomia and coated tongue in all renal patients, association between xerostomia and erythem in patients of group A, as well as association between xerostomia and angular cheilitis in patients of group C. This association was expected because angular cheilitis occurs in persons with present oral dryness, individuals under immunosuppressive therapy or among dehydrated patients. However the number of registered cases with angular cheilitis among renal transplant patients was significantly lower compared to pre-dialysis and hemodialysis patients. In a way xerostomia is an additional cause for the uremic bad odor and unpleasant taste which is more prevalent in groups A and B. Postorino (29) registered a dry mouth, which was associated with unpleasant metalic taste in patients with terminal stage of chronic renal failure, who had diabetes. Approximately, our findings for almost equal distribution of unpleasant taste among all three groups, were quite expected

and supports the opinion that in all uremic patients regardless of whether they are on hemodialysis or other type of therapy, comes to distortion of taste perception.(7) Low oral hygiene status, dental plaque accumulation due to demotivation from the patients who are in this condition are additional factors which jeopardize the obtained clinical finding. In our study we have noted association between unpleasant taste and the appearance of coated tongue among each of the investigated groups. According to our study the, coated tongue was the most common oral change of chronic renal patients. Similar results documented and other authors in previous reports (5, 6, 17).Coated tongue in our study was present in all hemodialysis patients of group B. Retention of residues of food, desquamated epithelial cells and bacterial accumulation due to the filiform papillae enlargement, aggravated maintenance of oral hygiene and decreased amount of saliva are the main reasons for the appearance of this common oral manifestation (33). In this context, quite logical is the obtained strong association between the coated tongue and xerostomia among all examined patients with CRF.

The uremic fetor was third most frequent oral symptom among the chronic renal patients**,** present in highest percentage in patients of group B (17 patients, 56.66%) and with the least prevalence in patients of group A (8 patients, 26.66%). The 56, 66% uremic fetor found in patients on hemodialysis, is similar to that reported by Kao et al. (50%) (15) and Estela De La Rosa (48%) (5).The uremic fetor in patients with CRF is considered that appears as a consequence of the high concentration of urea in saliva and its posterior transformation into to ammonium. (5, 27, 28) Investigating the intra-group association between oral symptoms and oral changes we have found association between uremic fetor and uremic stomatitis among hemodialysis patients and renal transplant patients.

No association was found between burning tongue and any of the oral manifestations, which is in agreement with the findings in the study of Estela De La Rosa (5). Predominant reasons for the appearance of burning tongue are dried oral mucosa, xerostomia due to most various etiologies, the presence of candidiasis, prolonged clearance of medications as well as vitamin deficit .This oral symptom was not detected among patients with CRF in pre-dialysis phase.

Frequent observation among all participants was pale mucosa, present in 64 of a total of 90 chronic renal patients, and its prevalence in group B was 90%. The appearance of pale mucosa in renal patients, we explain by anemia, which as complication of chronic renal disease is appearing in the early stadium and progresses with further loss of the renal function.

We registered high prevalence of dry fissured lips which were recorded among 27 patients (90%) of group B, 22 patients from group A and only in 8 patients of group C. De la Rosa et al. (5) reported presence of dry mouth in 28.3% patients with terminal renal disease and absence of any association with the other oral symptoms and changes. In contrast, in our study we have found strong association between dry fissured lips and thirst in dialysis and renal transplant patients.

Despite the fact that candidiasis is presented as common oral manifestations in patients with renal transplants in which usually occurs in the first few months of post-transplantation period, out of all study subjects only among 3 patients on hemodialysis was determined positive Candida Albicans findings. According to the data in the literature (8, 33) prevalence of oral candidiasis in patients with CRF who are on treatment with hemodialysis ranges from 5.7% to 37%. We consider that the patients

on hemodialysis who are immunocompromised due to suppression of cellular -induced immunity and dysfunction of granulocytes caused by persisting uremia (23,28), their poor oral hygiene, xerostomia and diabetes as most often etiological factor for CRF, make this group of patients high susceptible for oral infections. Therefore, should not be surprising the presence of infection by Candida Albicans, which present an integral part of the normal oral microflora, and in this case it is endogenous infection. The absence of oral candidiasis among transplant patients in this study we can explain with the fact that most of the patients were young with optimal level of oral hygiene and the rest of the patients were old aged with medical history of several transplant graft rejection and occurrences of oral candidiasis in the past.

Gingival enlargement as one of the most known oral manifestation among transplanted patients, whose prevalence according to data from different reports (18.31) ranges from 22% to 81%, in our research was detected in 14 (46.66%) renal transplant patients from group C. The undisputed fact is that the cyclosporine leads to this kind of oral alteration, but it raises the question of whether the dose of cyclosporine or duration of the therapy has more important role in the development of gingival enlargement. Regarding this issue opinions are very controversial (3, 11, 16, 24). Still, generally has been accepted the fact that pathogenesis of cyclosporine-induced gingival enlargement represents complex mechanism which includes number of cellular, local and hereditary factors. We suppose that antihypertensive drugs can also exacerbate this clinical finding.

From the conducted researches we were not able to find an association between the gingival enlargement and any of the noted oral symptoms, but we found an association with uremic stomatitis ($r = 0.419$, $p < 0.01$), or among 4 out of 14 total transplant patients with gingival enlargement simultaneously was evidenced presence of uremic stomatitis as well. The uremic stomatitis was also evidenced among four patients undergoing hemodialysis, and not even one case with uremic stomatitis was registered among CRF patients in pre-dialysis phase. The uremic stomatitis was diagnosed as painful erythematous area on the buccal and labial mucosa and covered with grayish exudates. Leao (19) and Ross (29) came out to the same realization in their researches. The results of obtained statistical analysis showed association between uremic stomatitis and uremic fetor, which was totally expected due their identical causal factor, rapidly increased serum and salivary urea concentration(1). Erythematosus appearances on the oral mucosa surface had highest prevalence among the patients from group A at whom we discovered that there is a strong association between erythematous areas and oral dryness.

Petechia bleeding in oral mucosa represents relatively common oral clinical finding seen in patients with chronic renal failure. In our study this clinical finding was detected in 90% of patients on hemodialysis treatment. In contrast, Kno (17) informs for 12.2% and De la Rosa (5) for 15, 2% prevalence of petechiae in patients on hemodialysis. We suppose that this clinical finding referees to the impaired platelet aggregation as a consequence of the uremic syndrome and accumulation of inhibitory factors in the blood that cannot be removed with the process of dialysis. Heparin and other anticoagulants are additional causal factors. The petechiae and ecchymosis in transplant patients have been reported as a secondary consequence of the unwanted effects of immunosuppressive therapy (32).

CONCLUSIONS

The stadium and consequently severity of chronic renal disease as well as the type of treatment have influence on the severity of the oral clinical finding in patients with CRF. Patients with CRF who were on treatment with hemodialysis had higher prevalence of oral manifestations compared with the patients with CRF in pre-dialysis phase and renal transplant patients. Coated tongue, thirst, pale oral mucosa and dry fissured lips were the most frequent oral symptoms and changes among all CRF patients independently in which group they have belonged.

Monitoring of the patients with CRF, local preventive and curative oral treatment as well as collaboration between nephrologists and dentists are just part of the measures for maintaining and improvement of the oral health among patients with chronic renal failure

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