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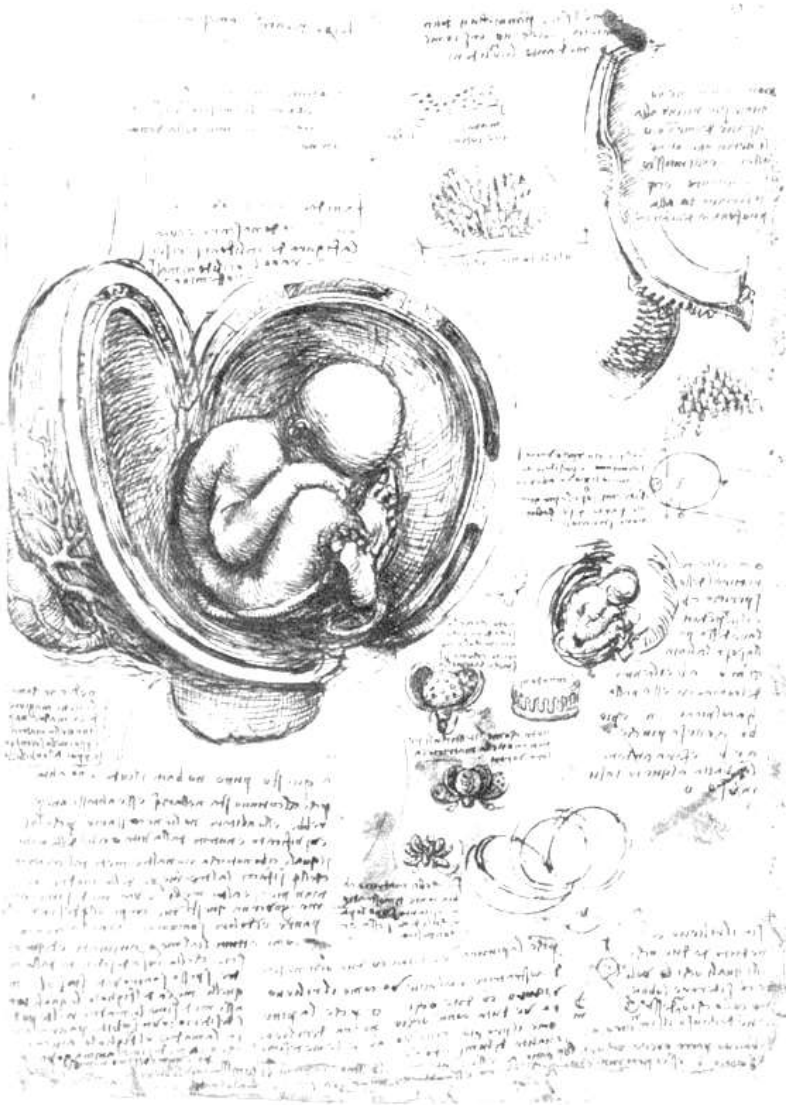

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CONTENTS

ARTICLES

CORRELATIONS BETWEEN RECURRENT ABDOMINAL PAIN AND IRRITABLE BOWEL SYNDROME

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Abstract

Objective: The aim of the study was to establish the correlation between recurrent abdominal pain and the incidence of irritable bowel syndrome(IBS) by evaluating all the patients from our department presenting gastroenterological symptoms during one year of study.

Methods: During the year of study, from all the patients with gastroenterological symptoms (abdominal pain, nausea, emesis, bloating and stool abnormalities), a total of 90 patients presented in our department with recurrent abdominal pain, have been included in the study.

Results: After the assessment of these patients, it was concluded that 37,7% of the patients were diagnosed with an organic disease, while 62,2% of them have fulfilled the criteria for functional gastrointestinal disorders. From the last group, 71,4% were diagnosed with IBS. Of the 40 subjects with IBS, females were predominant (57,5%). Patients presenting reccurent abdominal pain developed more often constipation in their last year of evolution. Also, there was noticed a higher rate of stressful life events incidence and a higher anxiety level.

Conclusions: Patients with recurrent abdominal pain should be assessed more carefully regarding the possible presence of IBS. Psychological factors like stressful life events, anxiety, depression could be implicated in the development of IBS.

Keywords: recurrent abdominal pain, irritable bowel syndrome, anxiety.

INTRODUCTION'

As there is no specific biomarker or test for establishing the diagnosis of IBS, the Rome IV guidelines outlines how to thoughtful approach the diagnosis of IBS. The presence of recurrent abdominal pain in association with abnormal bowel habits are the defining features of IBS.

The aim of the study was to find a possible correlation between recurrent abdominal pain and the presence of IBS. Also, we studied the psychological factors that are included in the ethiopatogenesis of IBS.

MATERIAL AND METHODS

From all the patients admitted for gastroenterological symptoms, a total of 90 patients were included in the study. The age range was between 22 and 58 at the study entry. The symptoms described were followed by a clinical examination and paraclinical examinations including: blood tests, stool examination, gastrointestinal transit with radiopaque contrast, gastroscopy/colonoscopy. Patients also completed questionnaires for anxiety (GAD-7 test).

RESULTS

After assessing all the patients, there was concluded that an organic disease was found in 38% of the cases while 62% met the criteria for functional gastrointestinal disorders (figure 1). Among the last group, 71,4% were diagnosed (according to the IV Rome criteria) with IBS (figure 2).

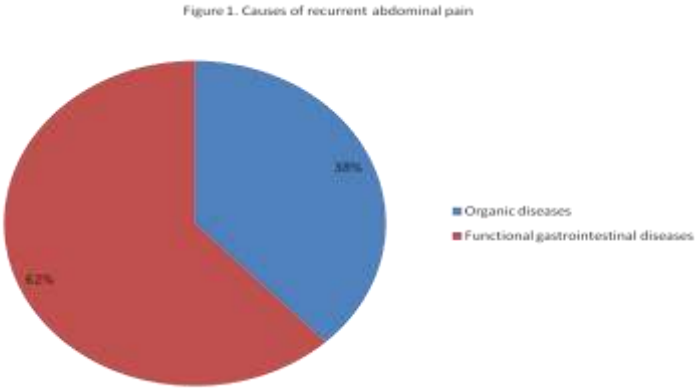

Figure 1. Causes of recurrent abdominal pain

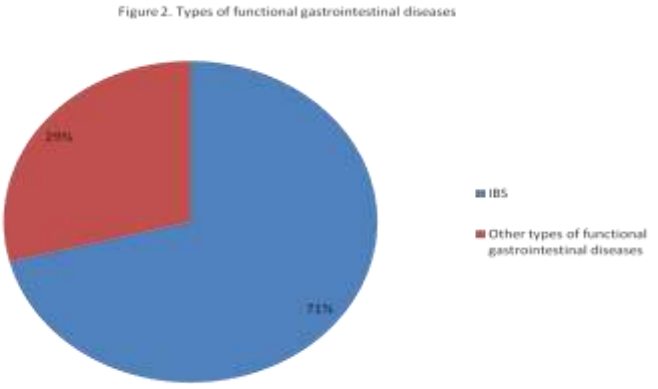

Figure 2. Types of functional gastrointestinal diseases

IBS patients range in age from 22 to 58 years with the mean age between 30 and 40 years (figure 3). Of the 40 pacients with IBS, females were predominant (F=23, M=17). Patients presenting recurrent abdominal pain in the past 12 months reported more often constipation than diarrhea (figure 4). Also, there was noticed a higher anxiety and stressful life events rate in the functional gastrointestinal group than in the organic disease patients group. Subsequent, the patients diagnosed with IBS asked for medical assistance more frequently that the ones diagnosed with organic disease.

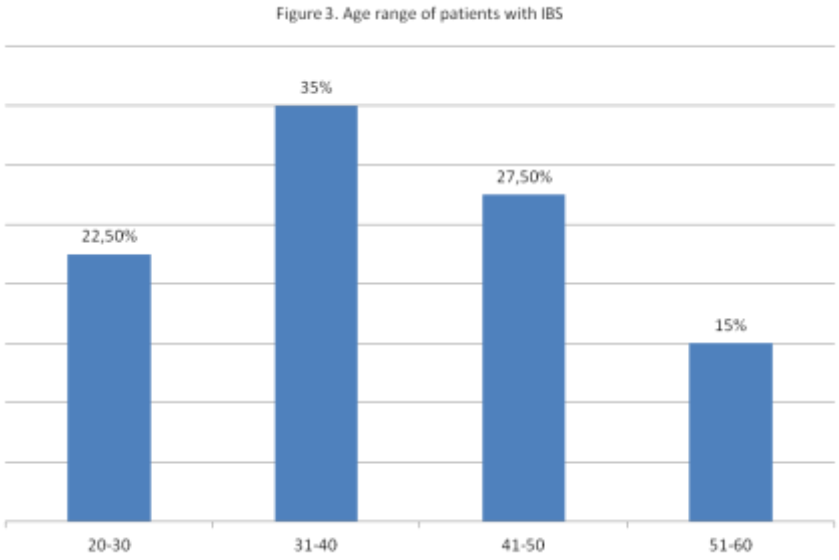

Figure 3. Age range of patients with IBS

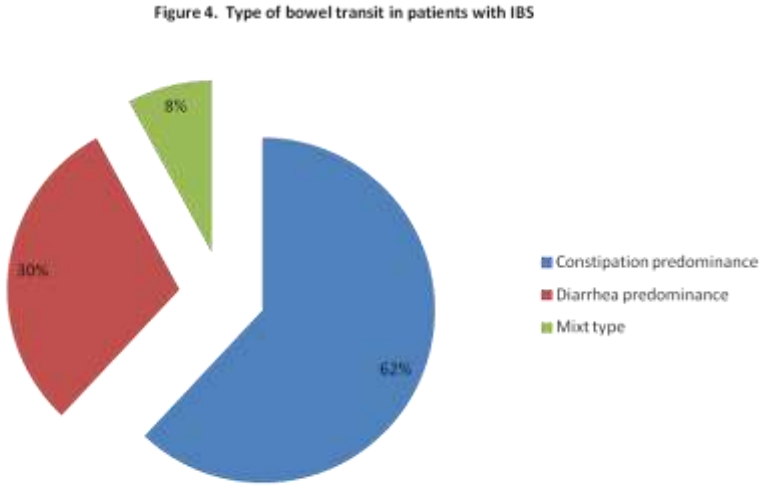

Figure 4. Type of bowel transit in patients with IBS

DISCUSSIONS

Functional gastrointestinal disorders (including IBS) represent a frequent cause for medical and gastroenterological referral.

Functional abdominal bloating (FAB)/distention (FAD) is characterized by symptoms (subjective) of recurrent abdominal fullness, pressure, or a sensation of trapped gas (FAB), and/or measurable (objective) increase in abdominal girth (FAD). Patients should not meet criteria for other FBDs, although mild abdominal pain and/or minor bowel movement

abnormalities may coexist. Symptom onset should be at least 6 months before diagnosis and the predominant symptom (bloating or distention) should be present during the last 3 months.

The prevalence of IBS varies between 5% and 20%, depending on the geographical area and the evaluation criteria. In Romania the prevalence of IBS is evaluated at 15%.

In the irritable bowel syndrome the main focus is on the abdominal pain and the altered bowel habit. Abdominal pain is intermitent, crampy and it can be related to defecation, be associated with a change in the frequency of stool or be associated with a change in the aspect of the stool, as the IV Rome criteria describes.

In our study, it was observed that the abdominal pain was related to the last two criterias, mainly. Most patients with IBS described these sort of symptoms one ore more times a week in the last minimum three months.

From the total of 90 subjects who reported recurrent abdominal pain, 40 were diagnosed with IBS. The incidence of IBS was 44,4%, a lot higher than the national rate. The possible explanation can be the higher rate of admitted patients during the year of study that work in fields that request focusing, supplementary working hours (IT, education, accountancy, management field, college/university period), factors that are known to contribute to anxiety, depression and subsequently to the onset of IBS. IBS was more frequent in woman than in man (F=23, M=17). The main age distribution was between 30 and 45 years. IBS wasn't diagnosed after 70 years, nor under 20 years.

Although data are limited, lifestyle modifications that may improve IBS symptoms include exercise, stress reduction, and attention to impaired sleep. Dietary fiber supplementation remains a cornerstone of IBS management, although its optimal use can be quite nuanced. Dietary restriction of gluten may improve symptoms in some IBS patients. Dietary FODMAP (fermentable oligosaccharides, disaccharides, monosaccharides and polyols) restriction is associated with reduced fermentation and significant symptoms improvement in some IBS patients.

Psychological and behavioral treatments relates to helping patients with IBS, reduce pain and discomfort and are seen as ancillary to or augmenting medical treatments. Treatments include cognitive behavioral therapy, hypnosis, and various relaxation methods to reduce muscle tension and autonomic arousal believed to aggravate gastrointestinal symptoms. A large number of studies in IBS confirm the values of these treatments.

The IBS group had a higher rate of using the medical care services (the fear of having cancer was reported commonly, so it was necessary to perform colonoscopy).

Psychological observations have shown that psychological symptoms like anxiety or depression are more common than in subjects with organic gastrointestinal diseases (except gastrointestinal cancer). It is notable that IBS is not a psychiatric or psychological disease, but there can be observed that psychological factors may play a role in the persistance of the symptomps (abdominal pain, mainly) and also in the impairment of quality of life and excessive use of medical care services. Our study supports these observations. Anxiety was often found during recurrent episodes of abdominal pain in patients with IBS.

CONCLUSIONS

1. The incidence of patients with IBS that were admitted in our department with recurrent abdominal pain was enough high (44,4%).

2. Female patients were reported to be more susceptible to developing this disease (probably due to the higher tendancy to anxiety of the female gender).

3. Psychological factors are often implicated in the ethiopathogenesis of IBS; in our group anxiety was found at higher rate in the IBS group.

4. The IBS group had a higher rate of using the medical care services (the fear of having cancer was reported commonly).

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The WHONET software in the bacteriological characterization of the high infections risk unit

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Abstract

The bacteriological characterization of some units with surgery profile according to the germs that were identified by the bacteriological unit in admitted patients represents an epidemiological model that allows the supervision of the bacterial flora spread in the hospital. Material and method: The analysis of the positive results – 355 bacteriological samples was undertaken by the utilisation of the WHONET software recommended by the World Health Organisation. Results: The WHONET software sends microbiological alert characteristics that detect microbial strains with nosocomial threat. In the Gynecology and Obstretics unit were issued 69 microbiological alerts, in the Surgery unit 5 microbiological alerts and in the Intensive Care unit 9 microbiological alerts with different priority degrees. Conclusions: The level of the microbiological alert which could be high, medium and low warns about the level of antibiotics resistance of the microbial strains identified in the units considered in the study and contributes to the identification of the infectious risk, becoming a tool that can be used in the control of the infections associated to the medical performance.

Keywords: microbiological alert, WHONET, infectious risk

INTRODUCTION

The World Health Organization recommends a computer software called WHONET, which is a free-access analytical tool available to laboratories, in order to characterize the level of microbiological alertness of the identified microbial strains for the global surveillance of bacterial resistance to antimicrobial agents. The WHONET 2017 software, used in 195 countries, with 844 active centers, allows microbial resistance monitoring at local, national or global level to be recognized as an integral part of the infection control strategy. (1)

The bacteriological characterization of the surgical units is essential in knowing exactly the types of circulating microorganisms that can colonize or infect patients, medical staff, medical devices and hospital environmental elements. Pre-operative bacteriological screening, microbiological analyses used for diagnostic purposes, along with clinical and paraclinical examinations provide clinicians with data on the evolution of postoperative patients and information to be used by epidemiologists in the control of nosocomiality.

METHODS AND MATERIALS

The retrospective, descriptive and analytical epidemiological study conducted in 2017 in a LMH Bucharest Health Unit is based on the analysis of positive bacteriological results, fulfilling the norms of medical ethics, in order to identify the spreading of germs in high risk surgical units.

In order to analyse the data, it was used WHONET proposed by the World Health Organization because it has facilitated: understanding the local epidemiology of microbial populations, selecting antimicrobial agents, identifying hospital and community outbreaks, recognizing laboratory quality assurance issues. (2) (3)

Our study used the software in order to analyse the microbial strains from the point of view of the pathogenic product in which they were identified, the pathogenic characterization of microbial agents, the study of local models of antimicrobial sensitivity in order to optimize the consumption of antibiotics, the interpretation of the microbiological alert level and their analysis from the epidemiological perspective.

RESULTS AND DISCUSSIONS

In order to understand the spread of potentially nosocomial germs, the Bucharest LMH Hospital sets the bacteriological screening of patients to be subjected to surgical interventions: nasal exudate, microbiological control of the axillary and inguinal tegument, urocultura. As a specific note, in the Gynecology Obstetrics Unit all patients with natural births benefit from a lochia screening within the first 24 hours from birth. During hospitalization, patients with clinical signs of infection were tested for pathological products for diagnostic purposes.

Out of 7995 patients, several types of pathological products were taken, namely nasal exudates, urocultures - lohiocultures, pharyngeal exudates, palatal secretions, vaginal secretions, conjunctival secretions, haemocultures, bronchial aspiration for microbiological diagnosis. Out of these, 355 samples were positive, 247 samples were collected for screening and 108 positive samples for diagnostic purposes. We highlight the high percentage (69.57%) of pre-operative positive bacteriological results found during screening that allow the hospital to monitor the spread of germs right from the admission and to take the appropriate antiepidemic measures. Analysing the positive bacteriological evidence we notice that the nasal exudates, urocultures and lochii were the pathological products with the highest weight in screening. On the other hand, for diagnose purposes, the range of collected pathological

products cover a larger range according to the possible localization of the infection: nasal secretion, lochii, urine, abscesses, bronchial aspirate connective tissue hemocultures.

From patients admitted during 2017, the 355 positive samples cover a wide range of gram positive bacteria, such as staphylococci, streptococci, enterococci - 54.92%, Gram negative bacteria - Escherichia coli, Klebsiella pneumonia, Proteus spp, Pseudomonas spp, Citrobacter spp., Enterobacter spp, Acinetobacter baumanii - 33.23% remaining positive isolates for Candida spp - 11.83%. (figure 1)

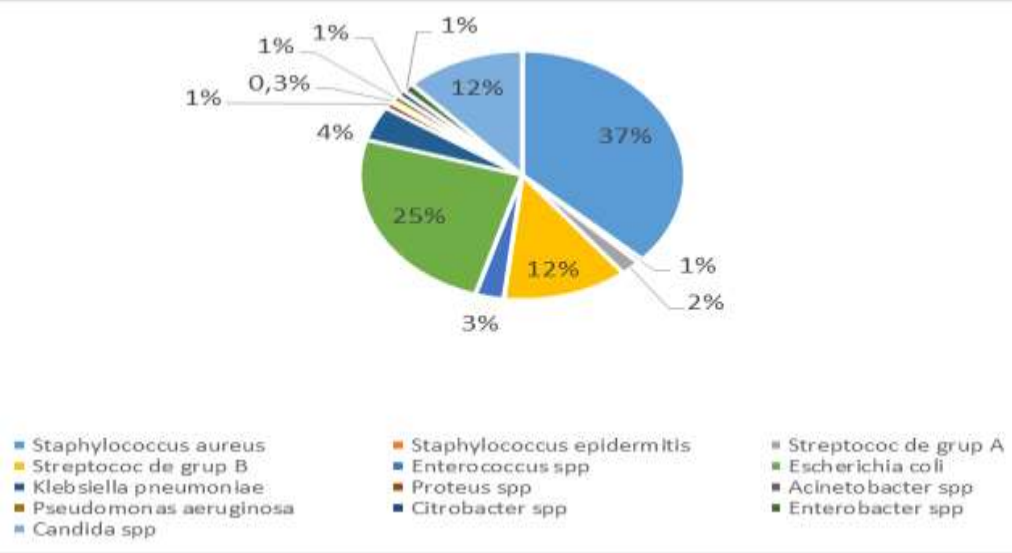

Figure 1. The weight of germs isolated from patients

Analysing the weight of germs in the Obstetrics and Gynecology and Neonatology unit, we find that Gramm positive isolates - 60.90% exceed Gramm negative and Candida. The high percentage of Gramm positive germs in hospitalized patients stem from screening examinations, being colonized at the time of admission, and introducing MRSA and MSSA staphylococci and group B streptococci requiring increased attention and differentiated therapeutic measures.

In the general surgery unit, the same percentages prioritize the Gramm positive circulant flora - 62, 85% compared to the existing negative flora and Candidda spp - 37.14%, the isolated bacteria stemming from infectious patients hospitalized for more than 96 hours, which draws attention to the way bed treatment techniques are undertaken.

In contrast, in the Intensive Care Unit, Gramm negative and Candida spp isolates prevail - 83.87%, worrying if we consider that here lies the greatest risk of nosocomial disease, patients are mostly immune-suppressed and antibiotic treatments are in large doses, over long periods of time. In fact, the antibiotic therapy applied explains the high percentage of Candida albicans in the Intensive Care Unit as well, which glooms the patient's prognosis.

The factor that differentiates the units is the number of spreading bacterial strains the WHONET software has classified as microbiological alerts in various priority levels (Figure 2) (3)

In the Department of Obstetrics and Gynecology -Neonatology the large number of microbiological alerts provided by the WHONET software - 69 belong to 5 species: group B streptococcus - 37 alerts, MRSA - 25 alerts, enterococcus 2 alerts, Escherichia coli - 4 alerts, Pseudomonas aeruginosa - 1 alert. In this unit we find a particular situation. B-group Streptococcus strain with a low level of microbiological alert -37 was isolated from patients' lochii and the WHONET software proposed the decolonization of patients and new-borns with antibiotic treatment, taking into account the increased infectious risk for the mother-

endometritis and for new-borns - meningitis. The other 32 strains with an average level of microbiological alert require infection control measures as well as anti-epidemic measures.

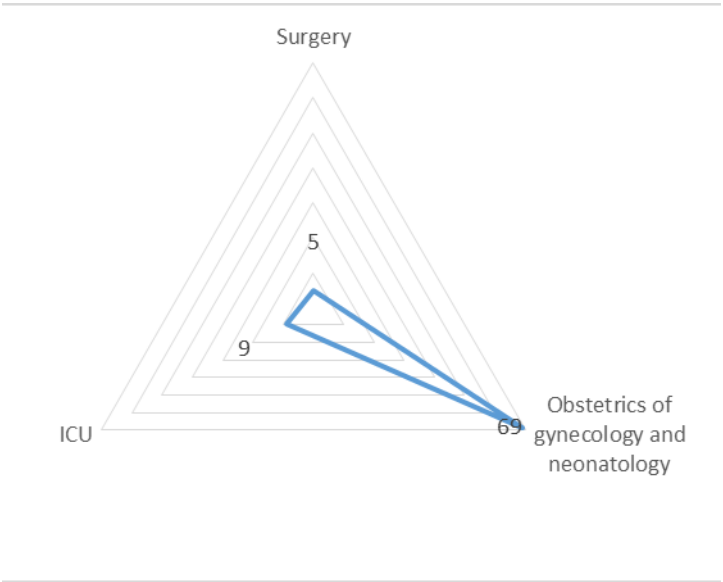

Figure 2. The histogram of distribution of microbiological alerts on units

In the Surgery unit 5 microbiological alerts with an average degree of priority were identified, representing 14.28% of the total positive bacteriological samples. We specify that in this unit the tests for bacteriological investigations are made in a larger number for diagnostic purposes in order to identify the etiological agent of a possible infection and in smaller number for screening purposes.

We mention that group B streptococci identified in the Surgery Unit were not characterized by the WHONET software as having a microbiological alert degree, as these germs in other sites are considered commensal.

In the Intensive Care Unit, the number of microbiological alerts that WHONET has revealed is 9, they belong to a number of 7 bacterial species, namely: MRSA - 2 alerts, Staphylococcus epidermidis - 1 alert, enterococcal – 1 alert, Escherichia coli - 2 alerts, Pseudomonas aeruginosa - 1 alert, Klebsiella - 1 alert, Enterobacter - 1 alert.

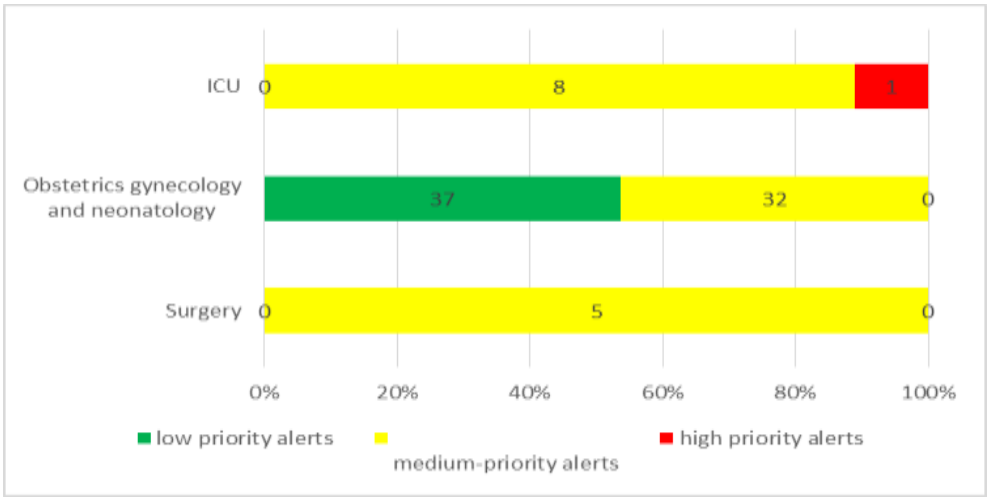

Figure 3. Types of microbiological alerts and their priority level by units

In the Intensive Care Unit, the 9 microbiological alerts reported by the WHONET software are listed according to the following hierarchy: 1 high-priority microbiological alert qualifying for a special treatment requiring mandatory isolation of the patient in the septic ward, intensification of the decontamination measures and disinfection of working environment and cold or warm sterilization of the medical tools, decolonization of medical and ancillary personnel identified as healthy colonized carriers. The remainder of the 8 microbiological alerts belong to the medium priority level and require antiepidemic surveillance and control measures to prevent nosocomiality (Figure 3) (4)

CONCLUSIONS

The bacteriological characterization of each unit shows that Gramm-positive flora dominates in the Surgery Unit - 65.71% and Obstetrics Gynecology and Neonatology Unit - 58.3%, while Gram-negative flora predominates in the Intensive Care Unit - 45.16% because it finds easier colonization sites on patients, medical staff and invasive medical devices more commonly used in this category of patients.

2. The high, medium and low microbiological alert level highlights the antibiotic resistance level of the microbial strains identified in the units included in the study.

3. The bacteriological characterization of each unit contributes to the identification of infectious risk and it is a useful working tool that can be used by doctors to control infections associated with the medical performance.

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Impact of histological subtypes and anatomic location of basal cell carcinomas on the outcome and the regimen of radiotherapy as a treatment modality

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Abstract

Radiotherapy is a valueable treatment option for basal cell carcinoma (BCC). This study aims to assess whether histological subtypes and location of BCCs alone can be correlated with either radiotherapy outcome or dose regimen. An analysis was conducted on thirty randomly chosen patients diagnosed with BCC and treated with radiotherapy at the Oncology Institute Professor Doctor Alexandru Trestioreanu. We have observed that 69% of documented recurrences occurred in cases with ulcerated or nodular ulcerated BCC subtype. However, in our study, histological subtype and anatomical location could not be correlated with documented recurrence, disease free survival (DFS) rates or total dose of radiation. Taking in consideration the indications of radiotherapy for BCCs, in these cases, other characteristics may have a more significant impact on the outcome and the preferred dose regimen.

Keywords: Basal cell carcinoma, radiotherapy, basal cell carcinoma histology

INTRODUCTION

Basal cell carcinoma is the most common cutaneous malignancy, responsible for over 90% of cancers in humans; it is slowly progressive, with a low degree of malignancy –as it rarely metastasizes, but it islocally aggressive, invading both peripherally and in depth.

Numerous treatment modalities may be employed, such as surgery with predetermined margins, cryotherapy, topical therapy using imiquimod or ingenol mebutate, electrodessication, curettage, photodynamic therapy and radiotherapy, to name just a few.

The decision on which optionis best suiteddepends on a number of factors, including age of patient, previous treatment(s), anatomic localisation, general state of the patient (able/not able to undergo surgical excision, functioning or bedridden, etc), cost of treatment and insurance coverage, treatment availability, tumor advancement/stage, number of lesions (isolated tumors versus Gorlin-Goltz syndrome), ans so on.

Although advances in surgical techniques, especially Mohs micrographic surgery, have led to a decline in the use of radiotherapy, this treatment modalityis still currently in use.

However, radiotherapy (either used alone or as an adjuvant) has not lost its place in the therapeutic armurarium. As for radiotherapy alone, it is mostly used when a surgical procedure may result in a significant cosmetic defect or in the case of unresectable carcinomas, while adjuvant radiotherapy has numerous indications, such as positive resection margins, perineural invasion, multiple recurrences and invasion of bone or nerves.[2, 4, 12]

Many studies have determined how different stages, anatomical sites and histologic subtypes affect local control, prognosis and recurrence or, in the case of radiotherapy, if total dose, number of fractions, length of treatment have a significant effect on the outcome. The aim of this study was to assess whether histological subtypes and location of BCCs alone can be correlated with radiotherapy regimens and DFS rates.[3,6, 8, 10]

MATERIAL AND METHODS

Thirty patients with biopsy proven basal cell carcinomas, treated with radiation therapyat the Oncology Institute Professor Doctor Alexandru Trestioreanu, between 2001 and 2017, were randomly chosen. The patients' ages ranged from 22 to 81 years (median, 65 years). The urban-rural ratio was 2,75:1. With 2 exceptions, all patients were surgically treated prior to radiation therapy, therefore adjuvant radiotherapy was used for 28 cases. The period of the follow-up ranged from 13 to 206 months (median, 38 months) and was calculated from the date the radiation therapy was initiated. Electrons were used to treat 28 cases, for those the dose and fractionation schedules ranged from 10 Gray in 5 fractions to 50 Gray in 20 fractions. Photons were used to treat 2 patients, one with a total dose of 30 Gray and the other with 39,6 Gray in 10 and 22 fractions. Thirteen patients had a documented (either clinic or imagistic) recurrence, in these cases the DFS was calculated after completion of radiotherapy. Correlation values were obtained using Pearson/Spearman tests, according to normality of each dataset.

RESULTS

While there are many histopathological types of BCC portrayed, there isn't yet a unified and generally accepted classification of BCCs. In this study, there were four major BCCs types described: nodular (with three histological variants) (Figure 1), micronodular (Figure 2), adenoid (Figure 3) and ulcerated (Figure 4). The nodular type was the most

frequent (24 patients) and the overall distribution of the histological subtypes and variants can be seen in Table 1.

Table 1. Histological subtype and site distribution of basal cell carcinomas with total radiation dose

Characteristics	Number of patients (total)	Number of patients with documented recurrence	Minimum dose (Gy)	Maximum dose (Gy)
BCC histological subtype and variants				
• Nodular	24	10	18	50
- Ulcerated	19	7	20	50
- Clear cell, ulcerated	1	-	18	18
- Pigmented	4	1	30	30
• Micronodular, follicular	1	-	30	30
• Adenoid, cystic	2	1	10	30
• Ulcerated	3	2	30	50
Site				
• Head and neck	26	11	18	48
- Lips	3	1	20	28
- Area of eye	5	3	10	40
- Ear	2	1	30	48
- Nasal pyramid, paranasal and orbito-nasal regions	8	1	18	44
- Parotid gland region	1	1	39,6	39,6
- Other (cheek, frontal, parietal)	7	4	30	30
• Trunk	4		30	50
- Lumbar	1	-	30	30
- Labial	2	2	50	50
- Scapular	1	-	30	30

Eighty-six percent of the basal cell carcinomas were located on the head and neck, with 14% on the trunk (half of these on the labial region). The site distribution can also be observed in Table 1.

In the cases where radiation therapy proved unsuccessful, the median time to recurrence was 39,5 months. The latest one occurred at 84 months. From a total number of 13 patients who had a documented recurrence, 77% were diagnosed with nodular BCC and 69% with either nodular ulcerated or ulcerated BCC. Eighty-five percent of recurrences were situated in the head and neck region, with highest rates around the eye and other (cheek, frontal, parietal) areas. Lowest recurrences were observed on the nasal pyramid, paranasal and orbito-nasal regions (12%).

Therefore, in this study, is no correlation between the histological subtype of the BCC and the dose and fractionation schedules. Also, there is a weak non-significant correlation between age and recurrence of the BCCs (0,31) while no significant correlation between age and DFS (-0,17) or age and total dose (0,13).

Total dose is highly variable for BCCs located on the head and neck (from 10 to 48 Gray), butis always over 30 Gray for BCCs located on the trunk (30 Gray for lumbar and scapular regions and 50 Gray for labial region). However, for cases with recurrent disease, there is a moderate negative relationship between DFS and total radiation dose (-0,50).

Twelve months after the initiation of radiation therapy, all patients were free of disease; 24 months after completion of radiotherapy, 2 patients had documented recurrence, and out of the 6 patients with a 5 year follow-up, 2 had documented recurrence.

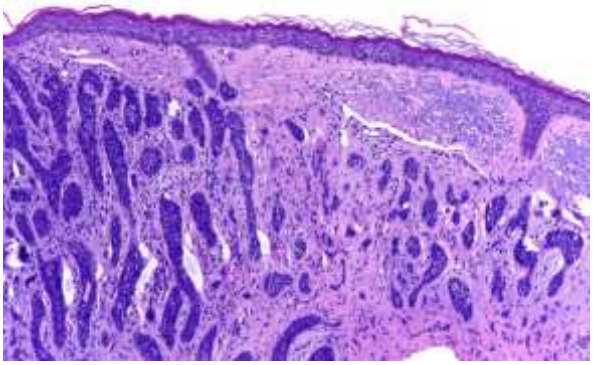

Figure 1: Nodular basal cell carcinoma. Haematoxylin and Eosin, 40x magnification

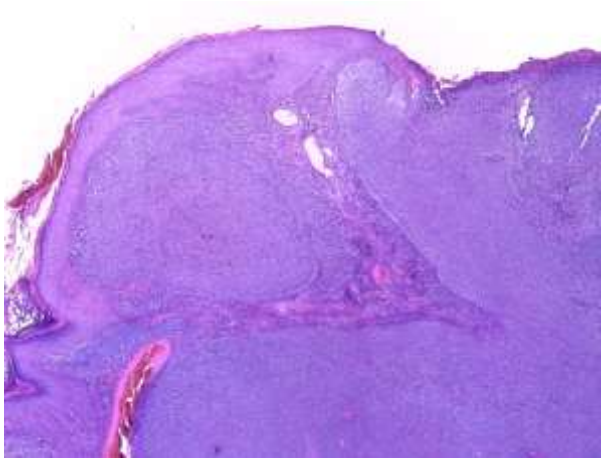

Figure 2: Micronodular basal cell carcinoma, Haematoxilin and Eosin, 100x magnification

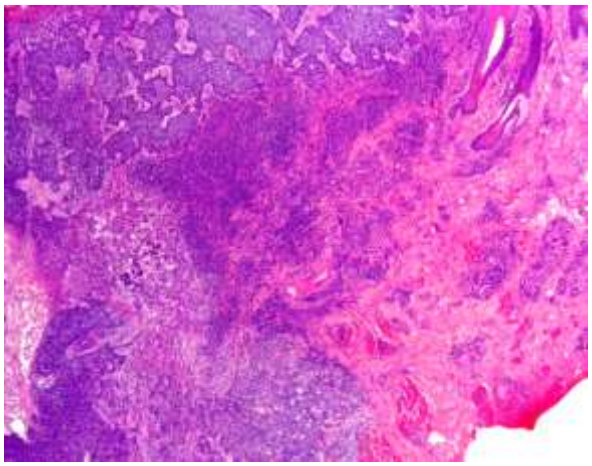

Figure 3. Adenoid subtype of basal cell carcinoma. Haematoxylin and Eosin, 40x magnification.

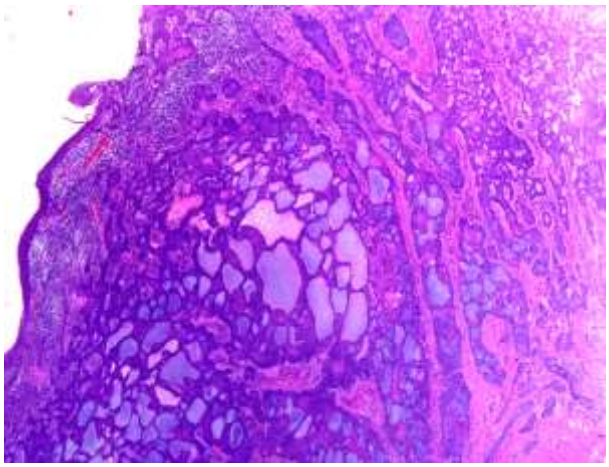

Figure 4. Ulcerated nodular basal cell carcinoma, Haematoxilin and Eosin, 40x magnification

DISCUSSIONS

Many studies correlate the histological classification of basal cell carcinoma with prognosis or recurrence. However, this classification is complex, lacks uniformity and a clear definition, therefore, up to now, there have been as many as 26 histopathological types of BCC described by various authors. One common point of BCC classifications is that nodular BCC is most frequent, also demonstrated in this study. However, most authors agree that nodular BCC is a representative of low-risk subtypes and a very low recurrence rate, which was not the case in the present study (77% of documented recurrences occurred in patients diagnosed with nodular BCC). It is also agreed upon the fact that nodular basal cell carcinoma is associated with ulceration, more than all other subtypes. In our case, 69% of recurrences had an initial diagnosis of nodular ulcerated or ulcerated BCC. Taking all this into consideration, it is possible that ulceration may have an impact in predicting recurrence. (1, 3, 9, 11)

On the other hand, with such a great number of histological subtypes, the reproducibility and comparison of clinical findings and therapy results is altered. As is the case in the present study, when assessing outcomes data, there should be a staging system employed based on size and extension into adjacent structures. The NCCN's recommendations regarding radiation dose depend on the size of the lesion being treated. At the same time, as discussed previously in the results section, there is a generally wide

variation in the total dose of radiotherapy used, with poor agreement between radiation oncologists about ideal radiotherapy regimens and ideal dose to use. Therefore, there was no correlation between histological subtype and the dose and fractionation schedules. As far as recurrent cases are concerned, the moderate negative relationship between DFS and total radiation dose may be explained by the clinical or otherwise documented high-risk characteristics of the carcinoma (that could explain a lower DFS after radiotherapy).[5, 2, 9, 4, 13]

When categorized by anatomic location, recurrences of the head and neck occurred most frequently in the eye area and frontal and left parietal region. However, most studies agree that carcinomas on nose and ear are more likely to recur given their difficulty to treat. Both cases of BCC on the labial region also relapsed (consistent with literature data) for these rare tumors are more likely to metastasize. There is no correlation between radiation regimens and tumor site for head and neck BCCs, however higher doses were used for labial, scapular and lumbar regions. This can't however be interpreted because, similarlyto the analysis of histological subtype, the moderate inconsistency with other results regarding tumor site and recurrence supports the idea that some other characteristics should be taken into consideration when analyzing outcomes or treatment. [1, 7]

Although there is only a small correlation between age and recurrence of BCCs, age should be taken into consideration especially when assessing prognostic or which treatment modality is best suited. Total dose does not correlate with age but radiotherapy as a treatment modality should sometimes be avoided, especially for young patients. [9]

CONCLUSIONS

The analysis of histologic subtypes of BCC in relation to documented recurrence, DFS, total radiation dose for patients with biopsy proven basal cell carcinomas who underwent radiation therapy showed that histologic subtype and its variants alone cannot be correlated with a positive or negative outcome. However, most recurrent cases were observed in patients diagnosed with either ulcerated or nodular ulcerated BCCs, which could predict recurrence. As for the location of BCCs included in the present study, there is no correlation between radiation regimens and the results are moderately inconsistent with other studies in regard to recurrence sites. Considering the indications of radiotherapy for BCCs, other characteristics such as staging, patient age, incomplete surgical removal, may have a more significant impact on predicting recurrence rate, DFS or the best radiotherapy regimen.

Conflict of interests: The authors declare that they have no conflict of interests.

Compliance with ethical standards: We undersign, certificate that the procedures and the experiments we have done respect the ethical standards in the Helsinki Declaration of 1975, as revised in 2000 (5), as well as the national law.

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Observations and reflections on sarcopenia - decline of muscular function

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Abstract

Introduction: Sarcopenia is a disease characterized by decreased skeletal muscle mass, muscle strength and function, which can affect the quality of life by increasing physical disability, adverse metabolic effects and mortality. Recently sarcopenia has aroused renewed interest.

Objectives: Through this presentation we wanted to bring to the attention of clinicians, reflections on the etiology, methods of diagnosis/evaluation, prevention and treatment in sarcopenia.

Material and methods: Based on literature data and specialized studies.

Conclusions: The evaluation of muscle mass, muscle strength and functional capacity have important clinical implications in the therapeutic approach. Early identification of sarcopenia plays an important role in prognosis and evolution. Preventive measures such as nutritional intervention and physical activity could help reduce the number of people with sarcopenia and maintain the independence of the elderly. Proper intake of vitamins and proteins are recommended nutritional interventions in the treatment of sarcopenia. The assessment of sarcopenia is complex both in medical practice and in research. By establishing well-defined interventions and by the collaboration of all the specialists in the medical fields involved in the pathology of the elderly, we can prevent and delay the installation of this syndrome.

Keywords: skeletal muscle, elderly, sarcopenia.

INTRODUCTION

Sarcopenia has attracted the recent relative attention of scientific researchers. To date, there is more information on this issue, while the disease investigation is ongoing. Through this presentation we wanted to bring to the attention of the clinic reflexes regarding this etiology, the method of diagnosis / evaluation, the prevention and treatment of sarcopenia. Evaluation of body composition refers to the habits of quantification of body fat and muscle mass and is most commonly evaluated by medical imaging [1,2]. In the last decade, the importance of muscle mass has been emphasized and can reach a focal point for clinical research [3]. In 2016, however, sarcopenia is a positive classification for the international classification of diseases (ICD-10-CM), with the code M62.84. Sarcopenia, first introduced in Rosenberg in 1984, refers to the loss of age-related muscle mass, thus being a geriatric syndrome [4]. It studies the measures in which the elderly exist and the relation with the physical deficiencies, the quality of the low life and the high costs of medical care. Recently, the concept of sarcopenia has been extended to each disease, beyond points from a consideration only as geriatric syndrome [5]. Screening for sarcopenia in osteoporosis cases in postmenopausal patients, or immobilized patients can significantly influence the prognosis of sarcopenia. Sarcopenia manifests it self in "cascade", namely: Low muscle mass and strength, limited physical performance, increased risk of falling, all associated with decreased bone resistance, characteristic fragility in osteoporosis, resulting in poor health, mortality, which is recommended of utmost importance in prophylaxis, early detection and treatment of sarcopenia.

Aim and objectives

Through this presentation we wanted to bring to the attention of clinicians, reflections on the etiology, methods of diagnosis/evaluation, prevention and treatment in sarcopenia.

MATERIAL AND METHODS

Materials and methods are based on data from literature and specialized studies.

Epidemiology

The process of decreasing muscle mass is accelerating after 70 years. One of the most pronounced changes in the elderly is the loss of mobility and physical capacity, degrading the quality of life. These changes occur due to progressive loss of skeletal muscle mass and function, a process known as sarcopenia [1]. After 25 years of age, muscle mass decreases from 3% to 10% per decade [2]; and reaches a rate of decline of 1% per year at older ages [3]. This decline in skeletal muscle is independent of ethnicity, age, morbidity, income or health behaviors and is a major global public health problem [4]. Furthermore, changes in skeletal muscle can lead to other diseases that occur during aging, such as decreased metabolic rate, increased insulin resistance, and bone loss [5].

Etiology

The main causes of this condition are considered: inactivity, through sedentary lifestyle, it loses between 3-5% of the muscle mass per decade, the increase of the level of free radicals, obesity, alteration of protein synthesis or low protein intake, calcium deficiency, menopause and hormonal problems. In addition to all these causes, the blood flow of the muscles plays an important role in maintaining muscle mass. Poor blood flow causes weakening of the muscles, and proper and proper nutrition can no longer play the role of stopping muscle damage. Muscles consume much of the body's energy and are in a process of

continuous deterioration, which is accentuated during sleep and between meals. During the meal, the insulin released from the pancreas helps keep the muscles in good working order.

Potassium is an important element for the functioning of the muscles. Potassium deficiencies are associated with weakening of the muscles and diminishing it. Also, magnesium, calcium, phosphorus helps maintain the health of the muscular system. Vitamin C is also required for the formation of collagen and elastin fibers, essential components of the structure of the muscles. Vitamin B deficiencies are associated with muscle problems, such as lack of coordination and loss of balance, increasing the risk of falls. Smoking speeds up the process of muscle damage because the harmful substances in cigarettes destroy Vitamin C and other key elements necessary for the proper functioning of the muscles.

Recent evidence has suggested that sarcopenia may occur not only due to aging, but also as a result of other pathologies associated with aging. Despite these new considerations, the definitions of sarcopenia are now focused on establishing the loss of muscle function more than the loss of muscle mass as a potential predictive model of frailty in the elderly [6]. Some authors have been particularly interested in late-life interventions to prevent symptoms of sarcopenia or to improve markers and outcomes of sarcopenia, in this sense it has been described that calorie restriction and some pharmacological interventions can only improve physical fitness when identified. a time interval for intervention [7].

Sarcopenia can be caused by the decrease of the contractile elements [8], by reducing the total number of muscle fibers, by decreasing the size of the type II muscle fibers or by losing the motor units [9]. However, the mechanisms underlying these changes were only partially understood. Thus, the cellular and molecular mechanisms underlying the functional loss in the muscle of the aging skeleton need to be studied in detail.

Some of the changes at the cellular level, observed in the aged muscle cells include the accumulation of intra- or extracellular lipids; incorrect distribution of structural and contractile proteins and mitochondrial dysfunction [10]. Current evidence suggests that mitochondrial respiratory enzymes decrease, particularly complex IV [11]. decreased mitochondrial content and also increased carbonic anhydrase associated with mitochondria [12] seem to be key factors in the process of muscle aging, as demonstrated by reducing both DNA copies and the activity of tricarboxylic acid cycle enzymes [2,13]. One of the main theories of cell aging establishes that there is a strong positive correlation between age and oxidative damage [14]. In this regard, recent studies have shown that oxidative stress contributes to mitochondrial dysfunction, but is not linked to atrophy of muscle fibers, which separates oxidative stress from loss of muscle mass in sarcopenia [15]. Other studies have documented that events of mitochondrial dynamics may respond to different stimuli that promote or decrease bioenergetics and mitochondrial metabolism [16]. However, the association between mitochondrial morphology and aging remains to be revealed. Nowadays, there is significant evidence supporting a close relationship between mitochondrial function and morphology in skeletal muscle [17,18]. A decrease in mitochondrial muscle volume, density, and function has also been found with age, but other studies argue that maintenance or even a tendency to increase mitochondrial density occurs during the aging process; In addition, changes in differential mitochondrial and glycolytic enzymes have been reported in different fiber types. Overall, existing evidence suggests that there is a relationship between mitochondrial morphology and aging, which may depend on the type of muscle fiber itself and which has not been complete. elucidated, which is still a controversial issue [19].

Diagnostic methods

At present, there are various methods for evaluating muscle mass by imaging (CT, MRI, ULTRASONOGRAPHY, DXA, BIA), and these methods need to be standardized. The use of imaging techniques with regard to sarcopenia is of particular importance in its

detection and evaluation. We wish to review the imaging modalities available for non-invasive evaluation of skeletal muscle.

CT has become the most widely used imaging modality in cross-section and is available worldwide. In particular, CT has become the standard diagnostic tool in many clinical states for procedures such as the treatment of sarcopenia and its evaluation [2]. CT can accurately differentiate between fat and muscle tissue, using the specific attenuation of each type of tissue, providing very detailed anatomical information. Due to the accuracy of the measurement of the adipose tissue and muscles, CT was considered the gold standard for investigating their quantitative and qualitative changes, especially for the area of the trunk where DXA is limited [3]. In addition, the reliability of CT to assess quantitative and qualitative changes in adipose tissue and muscle mass has been well documented over the past 25 years [4]. Beyond simply measuring muscle mass, CT can evaluate muscle quality based on identifying the adiposity portion of the muscle. For example, decreased attenuation indicates an increased fat portion in the muscles; The gross infiltration of fat can be separated from the muscle fibers. This aspect of CT also makes it suitable for the evaluation of adipocyte infiltration in muscle, known as myosteatosis [5]. However, CT is limited by the fact that it cannot directly measure the lipid content or distinguish between intra-myocellular and intermuscular fat. just for the purpose of evaluating body composition. Body assessment is possible when CT is used for the treatment of an associated disease or during the disease assessment period [3].

MRI uses differences in radiofrequency pulse sequence to distinguish between adipose tissue and fat-free mass. Like CT, MRI is also an imaging mode in cross-section, which allows accurate measurement of body fat and muscle mass. Unlike CT, MRI has the advantage that it has no radiation exposure, which makes it more suitable for long-term monitoring. In addition, MRI can evaluate the structure and composition of the detailed tissues, facilitating the quantification of muscle volume and quality in individual muscle groups. In particular, MRI can also provide information on edema, muscle inflammation, fatty infiltration, fibrosis and atrophy [8-11]. Regarding the assessment of muscle quality and myositis, MRI demonstrates the best contrast between adipose and muscle tissue [10] and has recently been shown to have a higher sensitivity for detecting early fat replacement of muscles, with an better visibility of anatomical details than CT [11]. Currently, the most common benchmark used in studies of sectional body composition is the L3 level of the lumbar vertebra. At this level, the field of view includes the large muscles and the main functional muscles of the human body, which are the psoas, paravertebral muscles (spinal erector, lumbar quadratus) and abdominal muscles (transverse abdominal, external and internal obliques and abdominal right), which recommend for the analysis of skeletal muscles. In several studies, a single scan at L3 level was the best compromise site for evaluating the total volumes of skeletal muscle tissue, visceral adipose tissue and subcutaneous adipose tissue [13-16]. However, MRI is limited by high costs and limited accessibility or availability. Its limitation also includes the long acquisition time of the image and the operational complexity. Therefore, assessment of body composition by MRI is performed when there are clinically obtained MRI images obtained during treatment or follow-up of the disease [9].

There are imaging techniques that are not yet fully validated, namely: *magnetic resonance spectroscopy,* provides information on the metabolism and biochemical structure of tissues, so that the imaging physician can determine the type of tissue present, can differentiate between intra-myocellular and extra-cellular fat [2].

Ultrasonography may be a good option for an initial assessment of the quality and quantity of muscle mass. Its major advantages compared to other ways are the low costs, the portability and the lack of radiation exposure. In particular, its portability is particularly advantageous: unlike other evaluation techniques, whose lack of portability limits their use in large epidemiological studies, portability produces a significant advantage in clinical settings,

which explains its increasing importance in the study. skeletal muscle [17,18]. Because no radiation is required, ultrasound can be used for all patients. Another important advantage of ultrasound is that it allows real-time visualization of the target structure, and through its echogenicity, it can provide information on the presence of inflammation, fibrosis and adipose infiltration [17].

Evaluation methods have been developed for sarcopenia, using questionnaires that determine its impact on the patient. A similarity between osteoporosis and sarcopenia was developed, a questionnaire similar to the one used for osteoporosis called *FRAX score*. The SARC-F questionnaire, which was validated regarding the impact on the risks and the health condition in the population. For each item, the corresponding score is awarded, with a minimum of 0 and a maximum of 10 points respectively, in total. A score between 0-3 denotes a healthy person and one above 4 is considered symptomatic for sarcopenia.

Prophylaxis

Nutrition is a key point for maintaining muscle mass. Proteins are elements needed by the body to maintain muscle health and strength. In order to prevent the appearance of sarcopenia, the specialists recommend physical exercises of resistance at any age because they have the role to increase the synthesis of the muscular fibers. The resistance exercises determine the contractions of the muscles against an external resistance. For this purpose, weights, floats, abdomen, splinters, climbing stairs, or climbing and descending exercises are recommended. It is important that the selection of physical exercises be made according to the general state of health and taking into account the degree of coverage of all the muscle groups, respectively those of the arms, back, chest and lower limbs. Another aspect to keep in mind is that physical exercises should not be done in excess, until they are exhausted or over a long period of time. The optimal interval between exercises is 2-3 days to allow the muscles to recover.

Treatment

As methods of treating sarcopenia, it is recommended to treat pathological conditions such as high blood pressure, diabetes, weight gain or other metabolic disorders. displacement, at least temporarily, until the condition of the muscles is restored or improved.

CONCLUSIONS

The evaluation of muscle mass, muscle strength and functional capacity have important clinical implications in the therapeutic approach. Early identification of sarcopenia plays an important role in prognosis and evolution. Preventive measures such as nutritional intervention and physical activity could help reduce the number of people with sarcopenia and maintain the independence of the elderly. Proper intake of vitamins and proteins are recommended nutritional interventions in the treatment of sarcopenia. The assessment of sarcopenia is complex both in medical practice and in research. By establishing well-defined interventions and through the collaboration of all the specialists in the medical fields involved in the pathology of the elderly, we can prevent and delay the installation of this syndrome.

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Malnutrition Risk Assessment in Patients with End-Stage Chronic Renal Disease Admitted in the Nephrology and Dialysis Compartment of the Emergency County Hospital Targu Mures

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Abstract

Aim and objectives. One of the most important complication in hemodyalisis patients is malnutrition. Its occurrence is associated with an increased risk of mortality and morbidity. The aim of this study was to determine the nutritional status and prevalence of malnutrition and its predictors among hemodialysis patients using the CONUT score. **Material and methods**. A total of 131 hemodialysis patients were recruited for this study and assessed for nutritional status. In addition to the CONUT score, we also calculated PNI score. The biochemical and anthropometric parameters including BMI, albumin, complete blood count, urea and creatinine were also measured. **Results and Conclusions.** According to the high prevalence of malnutrition in hemodialysis patients, the periodic assessment of nutritional status is essential in the attempt to reduce the risk of morbidity and mortality

Keywords: CONUT score, hemodialysis, malnutrition, nutritional status.

INTRODUCTION

Nutritional evaluation of patients with chronic kidney disease represents an essential step in the evolution and treatment of the disease. Numerous studies have shown that malnutrition is an important problem in patients with chronic renal disease that negatively influences functional activity as well as quality of life. They also have shown that there is a direct correlation between some parameters of the nutritional status and the risk of morbidity or mortality.

In order to capture changes in the state of nutrition in the early stages, the nutritional status should be assessed as soon as the patient becomes ill and is taken under nephrology evidence.

Therefore, the aim of the study is to assess the nutritional status of patients with end-stage chronic renal disease with the help of specific tools (CONUT score, PNI index) with the ultimate goal of early detection of changes in nutrition status and the presence of malnutrition.

Aim and objectives

Therefore, the aim of the study is to assess the nutritional status of patients with end-stage chronic renal disease with the help of specific tools (CONUT score, PNI index) with the main purpose of early detection of changes in nutrition status and the presence of malnutrition.

MATERIAL AND METHOD

This observational retrospective study included 131 patients with end-stage chronic renal disease, admitted in the Nephrology and Dialysis Department, Emergency County Hospital Targu Mures, Romania. The cases were selected from the archive of the clinic on the basis of the observation sheets from January 2016 to January 2018.

The study inclusion criteria were:

a) patients with end-stage BRC (GFR <15ml / ml / min / 1.73m^2);
b) patients who have received the necessary paraclinical and anthropometric determinations for calculating the scores;

The exclusion criteria were:

a) patients with absent or incomplete paraclinical and anthropometric investigations;
b) patients diagnosed with end-stage BRC but who died from complications suffered;
c) patients who have been hospitalized several times during the follow-up period;

Statistical processing was done with the GraphPad Instat Demo Version software. The quantitative variables were expressed as mean ± SD. The Kolmogorov-Smirnov test was used for normality testing. The T-Student test for the normal-distribution continuous variables was applied, and the Mann-Whitney U test for the non-parametric continuous variables. The categorical variables were expressed as number and percent, and the exact tests of Pearson chi-square or Fisher were used to evaluate the differences. The chosen threshold of significance was alpha = 0.05, $p < 0.05$.

Patients were routinely investigated for the following parameters: blood counts, serum cholesterol and triglycerides, glycemia, total protein and serum albumin, renal function parameters (creatinine, urea), ionogram (sodium, potassium, bicarbonate, calcium, iron) coagulation (INR, prothrombin time). In addition, data on demographic, clinical and

haemodynamic characteristics at admission, as well as possible comorbidities in patient medical records were obtained.

The evaluation of the nutritional status in these patients consisted in calculating the scores: CONUT (Controlling Nutritional Status), and PNI (Prognostic Nutritional Index). The CONUT score was calculated using albumin serum levels, total lymphocyte counts and cholesterol levels using a scoring system from 0-12 and correlated with different biochemical parameters ranges used as follows:

- ✓ serum albumin: ≥ 3,5 g/dl = 0 points;
  3,49 - 3 g/dl = 2 points;
  2,99 - 2,5 g/dl = 4 points;
  <2,5 g/dl = 6 points;
- ✓ total lymphocyte count: ≥1600/mm^3 = 0 points;
  1200-1599/mm^3 = 1 point;
  800-1199/mm^3 = 2 points;
  <800/mm^3 = 3 points;
- ✓ total serum cholesterol: ≥ 180 mg/dl = 0 points;
  140-179 mg/dl = 1 point;
  100-139 mg/dl = 2 points;
  <100 mg/dl = 3 points;

Patients with a CONUT score of 0-1 have a normal nutritional status, those with a CONUT score of 2-4 are at low risk of malnutrition, those with a CONUT score of 5-8 are at moderate risk, and those with CONUT score 9-12 presents a severe risk. The patients included in the study were divided into two groups according to the CONUT score: group 1 - CONUT score <3 points, especially patients with normal nutrition status to low and group 2 - CONUT score ≥ 3 points, malnourished patients.

The PNI score was calculated as follows: PNI = 10 x serum albumin (g / dL) + 0.005 x total lymphocytes (number / microlitre) and GNRI score was calculated using the formula GNRI = 1.598 x serum albumin (g / + 41.7 x Current weight / ideal weight (ideal weight = height (cm) - 100 - [(height - 150) / 4] for men and height (cm) - 100 - [height -150/2,5] for women.

RESULTS

As mentioned above, the studied population was divided into two groups according to the CONUT score as follows: group 1 (CONUT<3 points) included 49 patients (37.40%) with normal and low nutritional status, while group 2 (CONUT≥3 points) included 82 (62.59%) patients with moderate to severe malnutrition.

Of the 131 patients included in the study, there was a predominance of male gender (60.30%) compared to females (39.70%).

As regards the age of the patients studied, it was structured over decades of life, with a minimum of 18 years and a maximum of 86 years and the average age was 60.26 ± 13.78 years.

Regarding the body mass index, we noticed that the proportion of underweight patients is significantly higher in the CONUT 2 group compared to the CONUT 1 group (28.71±6.69 vs. 26.10±5.19 kg./m^2, p=0.01).

The basic characteristics of the study population as well as of the two CONUT groups are listed in Table 1. There were no statistically significant differences between the two CONUT groups regarding age, gender, comorbidities and haematological characteristics. The body mass index was 27.08±5.91 kg/m^2 for the total study population, with a significant difference between the two groups of patients (group 1 - 28.71 ± 6.69 kg/m^2 vs. group 2 - 26.10 ± 5.19 / m^2, p = 0.01).

Table I. General characteristics of the study population and the two CONUT groups

Parameters		Total, n=131	Group 1, n=49	Group 2,n=82	P value
Age, years		60.26±13.78	58.65±13.89	61.23±13.71	0.32
Residence, n (%)	Urban	60(45.80%)	28 (57.14%)	32(39.02%)	0.04
	Rural	71(54.19%)	21(42.85%)	50(63.41)	
Gender, n (%)	F	52(39.69%)	24(48.97%)	28(34.14%)	0.1008
	M	79(60.30%)	25(51.02%)	54(65.85%)	
BMI (body mass index, kg/m²)		27.08±5.91	28.71±6.69	26.10±5.19	0.01
Lymphocyte count, (/µL)		1415.59±666.22	1459.5±696.64	1389.4±651.58	0.43
Albumin, (g/dL)		3.30±0.64	3.96±0.31	2.90±0.43	<0.0001
Total cholesterol, (mg/dL)		156.86±44.47	157.61±41.04	156.42±46.64	0.88
CONUT score		3.31±3.02	0.22±0.42	5.15±2.30	<0.0001
PNI score		40.34±7.74	46.73±4.99	36.53±6.48	<0.0001
GNRI score		90.28±10.28	100.43±4.88	84.21±7.49	<0.0001
Hemoglobin, (mg/dL)		9.21±1.94	9.75±1.87	8.89±1.93	0.01
Neutrophil count, (/µL)		5925.31±4150.4	5526.7±4479.7	6163.5±3949.8	0.37
Thrombocyte count, (/µL)		232310.37±96209	218597±86206	240505±101341	0.3
Iron, (mmol/L)		11.50±6.78	12.02±6.63	11.18±6.89	0.34
Urea, (g/dL)		165.41±92.78	144.63±73.41	177.83±101.03	0.04
Creatinine, (g/dL)		8.21±4.05	7.93±3.77	8.38±4.23	0.63
Sodium, (mmol/L)		137.79±4.12	138.16±4.14	137.62±4.12	0.2
Potassium, (mmol/L)		5.30±1.18	5.24±1.14	5.33±1.22	0.81
Calcium, (mg/dL)		2.15±0.31	2.26±0.25	2.09±0.33	0.003
Bicarbonate, (mmol/L)		19.37±5.73	20.85±5.92	18.45±5.48	0.08
Prothrombin time		13.31±2.09	12.91±1.69	13.47±2.22	0.46
INR		1.09±0.17	1.06±0.11	1.10±0.19	0.42
Triglycerides, (mg/dL)		140.43±91.04	134.71±56.80	143.86±106.58	0.93
Diuresis, ml		1077.10±724.02	1218.8±787.86	992.54±675.06	0.11
Hospitalization days		9.13±6.10	6.93±3.81	10.45±6.81	0.001
Comorbidities, n (%)	Anemia	120(91.60%)	44(89.79%)	76(92.68%)	0.67
	HBP	109(83.20%)	38(77.55%)	71(86.58%)	
	Diabetes	45(34.35%)	20(40.81%)	25(30.48%)	
	Ischemic heart disease	45(34.35%)	15(30.61%)	30(36.58%)	
Neutrophil/Lymphocyte ratio (RNL)		6.09±7.10	6.19±8.29	6.03±6.35	0.29
Thrombocyte /Lymphocyte ratio (RTL)		207.15±142.91	197.99±147.61	212.63±140.66	0.33

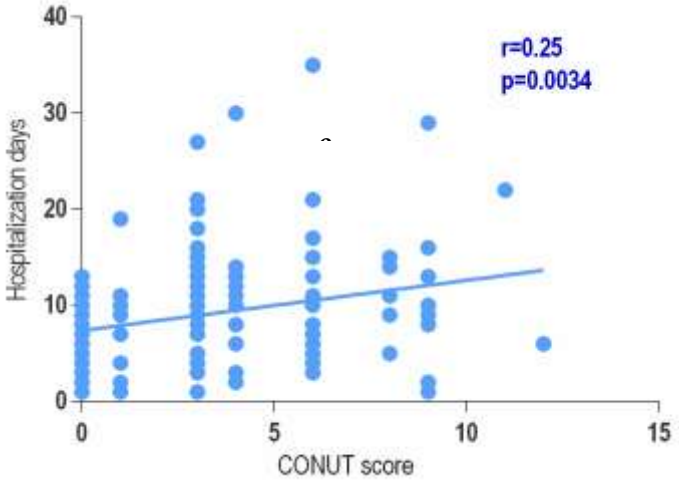

Figure 1. Correlation between Total Hospitalization days and Total CONUT score

Correlation between total number of hospitalization days and total CONUT score showed a weak but significant correlation between length of stay in hospital and total CONUT score, r=0.25, p=0.0034 (Figure 1).

The PNI index calculated for the total population was 40.34 ± 7.74 points and the results between the two groups were consistent with the CONUT score, patients with a normal nutritional status had a significantly higher PNI score compared to underourished group (54.4 ± 10.4 vs. 41.1 ± 2.8, p <0.0001).

The GNRI score for the entire population was 90.28 ± 10.28 points. In the analysis of the two CONUT groups, statistical differences were recorded, group 1 showing a significantly higher GNRI score than group 2, p <0.001.

Concerning paraclinic data, there were no statistically significant differences between study groups for total serum cholesterol (group 1 -157.61 ± 41.04 vs. group 2 156.42 ± 46.64, p = 0.88), serum creatinine (group 1 - 7.93 ± 3.77 vs. group 2 - 8.38 ± 4.23, p = 0.63) or triglycerides (group 1 - 134.71 ± 56.80 vs. group 2 143.86 ± 106.58, p = 0.93).

Hemoleucogram analysis did not show significant differences in lymphocytes (group 1 -1459.5 ± 696.64 vs. group 2 1389.4 ± 651.58, p = 0.43), neutrophils (group 1 - 5526.7 ± 4479.7 vs. group 2 - 6163.5 ± 3949.8, p = 0.37) and platelets (group 1 - 218597 ± 86206 vs. group 2 - 240505 ± 101341, p = 0.30). In contrast, patients with nutritional deficiency (CONUT 2 group) have lower hemoglobin levels (p = 0.01) compared to CONUT 1 group.

As for the ionogram, there were no significant differences between nourished and unnourished patients for sodium (p = 0.2), potassium (p = 0.81) or bicarbonate (p = 0.08). In contrast, lower serum calcium levels were found in group 2 (p = 0.003). Regarning albumin levels, the analysis showed statistically significant differences between the two CONUT groups (p <0.0001).

Analysis of the length of stay showed a total duration of hospital stay of 9.13 ± 6.10 days. The comparison between the two CONUT groups found that the malnourished patients required a significantly longer period of admission compared to nourished group (p = 0.001).

DISCUSSIONS

This study aimed at assessing the nutritional status of patients with end-stage chronic kidney disease, and the early identification of the presence of malnutrition and its signs. Therefore, according to the proposed objective and the results obtained, we wanted to compare these data with those already existing in other specialized studies.

Numerous studies have shown that the nutritional status of patients has a particular importance, and the presence of malnutrition in these patients negatively influences long-term prognosis.[1,2] The Controlling Nutritional Status (CONUT) score, based on serum albumin, total cholesterol and lymphocyte count, has been developed as a simple screening tool for detecting malnutrition among hospitalized patients.[3]

Serum albumin, a multifunctional protein produced at the liver, is influenced by a number of factors among which the most important are nutritional consumption and disease presence. A series of observational studies have shown that low serum albumin in dialysis patients is primarily associated with persistent systemic inflammation due to underlying disease and less inadequate nutrition.[4,5] Also, Pifer et al., (2002) [6] have shown that mortality risk is strongly associated with decreases in serum albumin. The same thing was observed in our study, patients in the CONUT 2 group (moderate to severe malnutrition) exhibiting low levels of albumin.

Of the laboratory analyzes performed in the patients under study, we also obtained differences in hemoglobin, serum urea and serum calcium. The results obtained showed that for patients in the CONUT 2 group, the values of calcium were significantly lower compared to the CONUT 1 group, with a higher mortality and morbidity risk, studies showing that chronic hypocalcemia is an independent factor in kidney disease chronic. [7]

Regarding the complications / comorbidities present in our study, the most common in the total group were anemia, hypertension, diabetes mellitus and ischemic cardiopathy. Concerning the presence of anemia, it was reported in an extremely high percentage (91.60%) in the total group of patients, the same high share being registered in the group with moderate to severe malnutrition (92.68%), the data being similar to literatura. [8]

A study conducted by Sathyan et al. in a tertiary care center has shown that there is an important association between chronic kidney disease, anemia and cardiovascular disease. They assert that proper risk management and adequate anemia correction will reduce the progression of the disease and prevent future cardiovascular events. [9]

Regarding the time of hospitalization, the results of the current study showed that undernourished patients generally required a longer period of hospitalization compared to the group without malnutrition. Agarwall et al. reported that subjects with a low nutritional status had a higher average duration of hospital stay and a significantly higher rate of reintervention. [10] Consequently, the need to implement a nutrition screening program as well as an interdisciplinary approach to hospitalized patients is absolutely necessary, ensuring active management of malnutrition in an attempt to improve both short- and long-term outcomes long.

Among the limitations of this study we mention:

- With regard to patient data collection, some paraclinical determinations required for the scores we used were not performed at the first intention or not during hospitalization, especially those not included in the basic package in a nephrologic emergency.
- Because the study was retrospective, we have not been able to follow the evolution of these patients for the long-term consequences of malnutrition.

CONCLUSIONS

This study has shown that assessment of nutritional status in patients with chronic renal disease should not be neglected, with malnutrition being present in a worrying percentage. More than that, in the analysis of our study, patients with CONUT>3 score (moderate to severe malnutrition) experienced complications / co-morbidities and hospitalization periods in a higher percentage than the normal or slightly deficient group, the risk of mortality and morbidity of these patients being much higher. The existence of a

screening program is absolutely necessary, the patient should be evaluated nutritionally from the nephrological evidence in order to identify the early signs of malnutrition.

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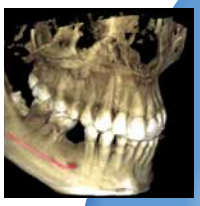

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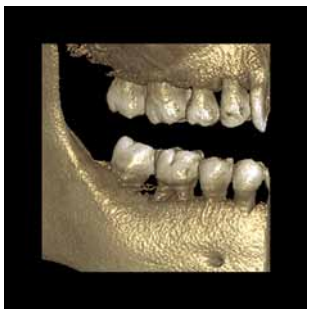

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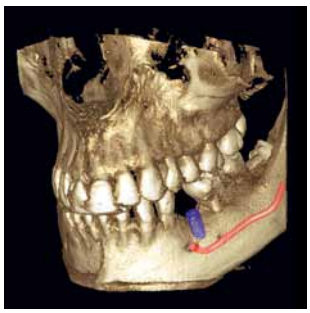

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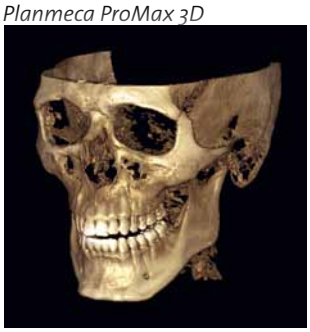

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Radiculary morphological study of lower wisdom tooth

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Abstract

The study presents aspects related to the radicular morphology of the lower wisdom teeth, aiming to several parameters: number, topography and orientation of roots. The variations of anatomical and morphological characteristics of the teeth are very important for any practitioner. These differences in root morphology are influencing the success of the endodontic therapy and the long-term prognosis of the tooth.

Keywords: lower wisdom tooth, root morphology, endodontic therapy.

INTRODUCTION

Wisdom teeth, or third molars, are located at the back of the mouth. They are the last adult teeth to erupt, or enter the mouth. Most people have four wisdom teeth, two on the top, two on the bottom. Third molars are considered to be "impacted" when they don't have enough room to emerge or grow normally.

Anatomic variations in any group of teeth are described in the textbooks of dental anatomy, although there are studies that reported variable root canal configurations. Anatomy of lower third molars is very varied, both coronary and especially radicular [1, 2].

The third lower wisdom teeth presents considerable morphological radicular variations: it can have one or several roots whose form varies. It frequently has two roots, a mesial and a distal one, which often merge, and it usually displays two radicular canals [3]. Often from restorative, prosthetic and orthodontic considerations endodontic treatment is required to this molar to be used as a functional element of dentomaxillary apparatus [4].

Successful root canal treatment depends on having comprehensive information regarding the roots/canals anatomy. Dentists may have some complication in treatment of third molars because the difficulty in their access, their aberrant occlusal anatomy and different patterns of eruption.

During the last decade the introduction of microcomputed tomography (CT) in endodontics, a non-invasive and non-destructive imagistic investigation method, allowed a more detailed analysis of root canal anatomy [5]. Every image resulted from the scanning represents a virtual cut plane and it allows a highly precise positioning of the sample, respecting the length of the root canal and its exact angles of curvatures [6]. Micro-CT has the great advantage that it is able to prevent radiographic or photographic transfer error by permitting accessible three-dimensional (3D) evaluation of the entire root canal system [7–10].

Teeth do not always have the same internal anatomy. The anatomical variations in number of roots, number of root canals, or even the shape of root canals are often encountered. Many clinicians used to treat every tooth like being a standard one. In these cases many failures occurred. In time, other practitioners studied the anatomy of root canal systems and their anatomical variations and they found out that there are many different types of teeth. The respective studies provide information that, if taken into account, might improve the outcome of endodontic treatment.

Undetection of supplementary roots or even supplementary canals is the major reason in the failure of endodontic treatment [11]. Endodontic treatment success requires the understanding of the anatomy and morphology of dental canalicular system, and the clinician must be prepared to identify all those teeth that show an unusual anatomical configuration [12].

From an anatomical point of view, based on form and number, the radicular canals of a unique root have been divided by Weine FS into four classes [3, 13]. A more complete classification than the one made by Weine FS, based on the number of radicular canals and their way into the dental root from the floor of the pulp chamber up to the apex, is the classification of Vertucci FJ, which divides them into eight types [14].

Aim and objectives

The aim of this article was to review and address the number of roots in lower wisdom tooth.

MATERIAL AND METHODS

For the study we accomplished the collection of 206 lower third molars from patients that came to our dental medicine department, for pains related to the mandibular third

molars or for other affections of the oral cavity and for whom the clinical examination underlined injuries on the level of the lower third molars, which required their extraction. The teeth were not removed specifically for this study.

Immediately after extraction, the molars were cleaned ultrasonically and then manually on the root surface, disinfected for 3 min in 2.5% sodium hypochlorite solution, rinsed with running water and then stored in artificial saliva (Artisial®/Biocodex, France) at room temperature until use (Figure 1).

The study offer data about the number, form and orientation of the roots.

Figure 1. Third lower wisdom teeth used in the study

RESULTS

Trying to identify for the molars that we have the number of roots, the topography, the orientation and, if it was possible, the form, we recorded a great variety (Figure 2). From the 206 molars with integral radicular macromorphology, 28 (13,59%) had a root; 150 that is the highest percentage (72,82%), had two roots arranged topographically one mesial and one distal; 26 had three roots (12,62%), in 24 of them the disposition of the roots being two mesial and one distal, and the other two, one mesial and one distal. Two lower wisdom teeth showed four roots: one having three mesial and one distal disposition, the other one with two mesial roots and two distal roots.

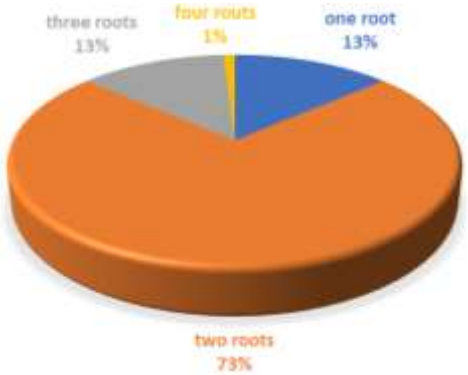

Figure 2. Percentage distribution of lower wisdom teeth by number of roots

Regarding the orientation of the roots we have met sixteen versions.

- For the molars with a root, it was present in percentage almost equal in right and distal position.
- For the molars with two roots, situated mesial and distal, we found six versions: two right roots; two distalized roots; the distalized mesial root and the distal right one; the distalized mesial root and the distal mesial one; the distalized mesial root and the distalized distal one; the distalized mesial root and the mesialized distal one.
- For the molars with thee roots, we identified also six versions: two mesial roots and one distal, all distalized; two mesial distalized roots and one distal right; two mesial

roots and one distal, all right; two right mesial roots and one distal, distalized; a right mesial root and two distalized distal; a distalized mesial root and two right distal.

The molars with four roots present: three mesial roots and one distal, all right; two mesial roots and two distal, all distalized.

DISCUSSIONS

Knowledge of root morphology is important in all specialties of dental medicine: prosthetic, odontology, orthodontics, periodontology.

The roots of the lower wisdom teeth can present a wide range of variations of form, curves and number, creating an entire series of situations of report, that come in the unfavour of the dentist. Some samples could be considered as anomalies of form. Accessory roots are most commonly seen especially in mandibular third molars [15].

The root canal morphology of mandibular molars varies among population groups [16].

Sidow et al. showed in their study that 17% percent of mandibular molars had one root (40% of which contained two canals), 77% had two roots, 5% had three roots, and 1% had four roots. Teeth with one root demonstrated the most unusual morphology, with the number of canals varying from one to six [4].

Guerisoli et al. found a great anatomical variability in the investigation of 114 mandibular third molars. The mandibular third molar had two root canals (a mesial and a distal) in 69.3% of the cases. A mandibular third molar with three roots and another with an accessory root, which differs from the former due to its reduced size, were found. The length of the mandibular roots did not vary as much as the maxillary third molars. Guerisoli DMZ et al. consider that mandibular third molars may have one, two or three roots and up to three canals [17].

After Gulabivala et al., 53% of the third mandibular molars have two separate roots. The majority (81–100%) of conical distal roots possess a simple type I (single canal) configuration, whilst the canal system of mesial roots is more complex: 52–85% contain two canals, of which type II (two orifices, one foramen) and type IV (two separate canals) are the most prevalent. The majority of roots of all molars contain one or two apical foramina (91–96%) and the apical third has the highest prevalence of lateral canals. Single-rooted molars have a wide variety of canal system. Conical roots tend to have simple canal systems, whilst flatter/broader roots have more complex canal systems [18]. In another study involving 173 third mandibular molars, Gulabivala K et al. found two separate roots in 68% of them, fused roots in 20% and a single C-shaped root in 11%. The majority of the mandibular third molars had two canals in this study (61%) [19].

According to Furri et al, 4.6 % of mandibular third molars had one canals, 18% had two canals, 72.8% had three canals and 4.6% had four canals [20].

Plotino presented a mandibular third molar with three separate mesial roots [21].

A study on an Iranian population showed that 21% of third molars had one root, 73% had two roots and 5% had three roots [22].

Cosić et al showed that 56% of lower third molars had one root and had two root canals in 90% of cases [23].

CONCLUSIONS

The number and orientation of the roots have imposed no less than sixteen versions, from a unique root to a mild distalization in the area of apex, up to multiple roots with different lengths, forms and orientations, even divergent. In the greatest percentage was found the version with two roots, one situated mesial and the other distal.

Dentists may have some complication in treatment of third molars because the difficulty in their access, their aberrant occlusal anatomy and different patterns of eruption. Mandibular third molar has a mesially tilt.

The orientation of the roots has demonstrated a great variety and the form of the roots proved to be so individualized that it did not submit to any rule. The radicular morphologic study of the lower third molars collected gave interesting data regarding the number and disposition of the roots, leading to a very large variety, not found in another tooth from the same arcade.

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Prosthetic treatment of terminal edentation using removable partial denture with extracoronal attachments

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Abstract

Removable partial denture (RPD) with attachments is an alternative to modern and aesthetic treatment, which should be considered for patients with terminal edentation. In our country, middle-aged patients frequently find themselves in this situation, and it is not always possible to adopt a treatment solution that includes implants. Because in removable partial denture the loss of a major tooth usually causes the loss of the entire prosthetic rehabilitation with significant material and psychological costs for the patient, it is a problem both assessing each patient's clinical situation and prognosis and choosing future support teeth.

A good knowledge of the possibilities of the particular system used, the design of the prosthesis in accordance with the biomechanical principles and the clinical experience help the dentist to achieve both aesthetic and functional skeletal prostheses which the patient can use successfully for years, provided they are properly maintained.

Keywords: removable partial denture, RPD, attachments, terminal edentation

INTRODUCTION

Tooth loss, has a major influence on biological, social, and psychological levels of the oral health-related quality of life [1-3]. The main reason for tooth loss was dental caries followed by periodontal disease [4,5]. The pattern of tooth loss has been assessed in different populations in various countries [6-12]

Extracoronal attachments are normally resilient to allow free movement of the prosthesis to distribute potentially destructive forces or loads away from the abutments to supportive bone and tissue. Three distinctive movements are defined in function: hinge, vertical, and rotational. The fewer abutments remaining, and the weaker the abutments are, the greater the need for resiliency or free movement to direct the forces away from the abutments to the supportive bone and tissue via the base of the prosthesis.

For the anchorage of the prosthesis skeleton a variety of special maintenance, support and stabilization systems are commercially available. Partial skeletal prostheses are attached to the remaining teeth using special anchoring systems (staples, slides, etc.). A special anchoring element is made up of two parts: a patrix type is attached to the crowns or bridges that will cover the neighboring teeth; the matrix part is embedded in the denture. Special systems are almost invisible, while providing excellent denture stability. Partial skeletal prostheses are more expensive than flexible ones or those with clasp. They are generally used as definitive treatment options.

Correctly executed skeletal prostheses have a fairly long life span. In fact, such works were performed very often before the implants appeared. Designing a partial prosthesis is essential in the success of treatment and will depend mainly on two factors: number and position of missing teeth; the condition and disposition of the remaining teeth in the oral cavity.

There are more than 65000 potential combinations of partial edentulism pattern in maxillary and mandibular arches, hence, it is logical to classify partially edentulous arches that have common characteristics and to facilitate communication among different dental professionals [13-16]. Kennedy's classification is considered the most broadly accepted classification for partially edentulous arches. Kennedy's classification offers immediate visualization, prosthesis support recognition, and assessment of removable partial denture design features [17-19]. Class I and II removable partial dentures that have multiple edentulous areas in which replacement teeth are being placed are further classified with modification states that were defined by Oliver C. Applegate [20,21].

An extracoronal attachment extends outside the normal contours of the crown of an abutment tooth. It is still necessary to place a restoration on the abutment tooth.

Aim and objectives

The purpose of this study was to determine how accommodate with skeletal prosthesis with sliding special systems, of Kennedy 1st or 2nd class patients.

MATERIAL AND METHODS

In this study, we included patients who needed removable partial denture with extracoronal attachments. Kennedy's class I and II are the most difficult type of treatment plan. The study was conducted on patients who agreed to the treatment, and inclusion of the case in one study.

A removable partial denture is a denture for a partially edentulous patient who desires to have replacement teeth for functional or aesthetic reasons and who cannot have a bridge (a fixed partial denture) for any reason, such as a lack of required teeth to serve as

support for a bridge (i.e. distal abutments) or financial limitations. Patients can remove and reinsert RPD when required without professional help.

Providing a useful and comfortable RPD requires careful diagnosis, planning, and maintenance. The steps involved in RPD-related therapy include the evaluation of abutment teeth, abutment tooth position, abutment preparation, adapting the RPD metal framework, relating the edentulous areas to the metal framework, communication with the laboratory, patient education for home care and maintenance, and regular professional recall.

It was explained to the patients the need for mobilizable prosthesis, following the perception and agreement for the proposed treatment.

Bilateral balanced teeth arrangement was carried out for each patient and trial denture was evaluated for centric, vertical relation, esthetics, form and phonetics.

RESULTS

For the success of removable partial denture with attachments therapy it is necessary to solidarize as many teeth as possible, because in these systems friction is exerted on large surfaces and requires more abutment (Figures 1-4).

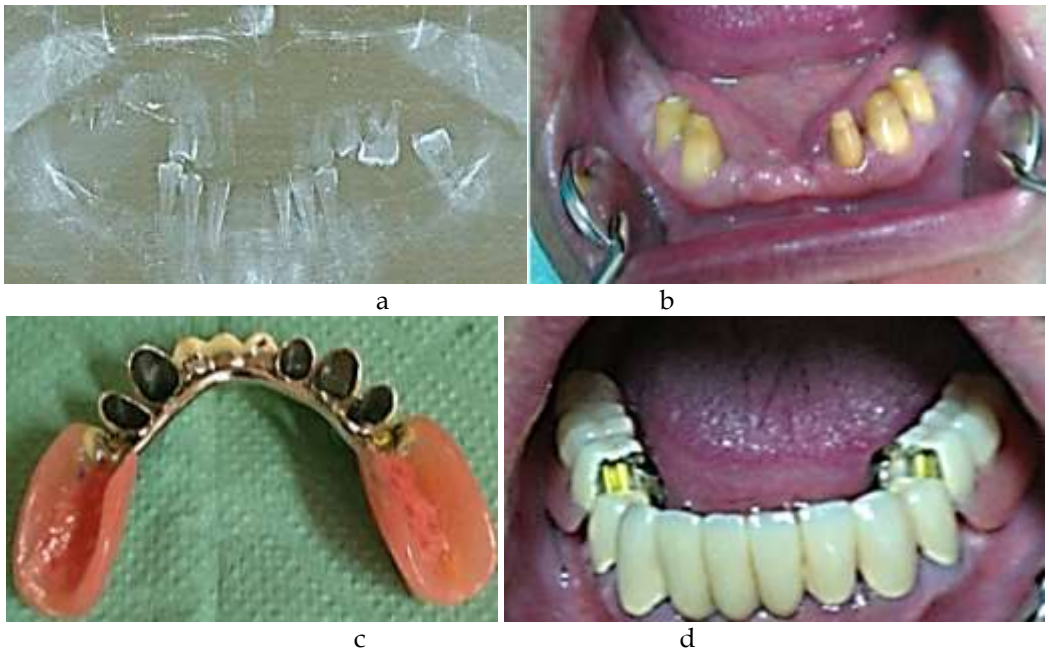

Figure 1. Figure 1: Case 1; a - orthopantomography; b – tooth preparation; c - mandibular removable partial denture with fixed partial denture; d - inserting the prosthesis into the oral cavity

Figure 2. Case 2 - Maxillary removable partial denture with attachments

a b c

d

Figure 3. Case 3; a - tooth preparation; b,c - mandibular removable partial denture with fixed partial denture; d - inserting the prosthesis into the oral cavity

Figure 4. Case 4 - Mandibular removable partial denture with attachments and clasp

Mastication and phonation have been satisfactory since the accommodation period. Obtaining a good prosthesis with a good balance to allow for a good masticatory efficiency has been achieved, comfort and preservation of the physiognomy appearance have brought the smile back to the lips of the patient.

During the evaluation and control at 6 months, it was found the good preservation of the attachment systems, the normal appearance of the oral cavity structures and the functionality of the prosthesis.

DISCUSSIONS

Patient satisfaction with the prosthesis can have a profound impact on the success of treatment because dissatisfaction with an RPD will likely lead to underuse and subsequent rehabilitation failure. Because dentists tend to focus on the physical function of the teeth while patients are more concerned with the social implications of RPDs, understanding why patients stop wearing their RPDs is critical [22].

Researches is needed regarding the effects of RPDs on the oral health of soft tissue and remaining teeth comparing commonly used materials with emerging materials for the fabrication of RPDs [23-28].

Extracoronal attachments are positioned entirely outside the crown contour of the tooth. The advantages of this type of attachment are that the normal tooth contour can be maintained, minimal tooth reduction is necessary and the possibility of devitalizing the tooth is reduced. Also, the path of insertion is easier for patients with limited dexterity. It is more difficult to maintain hygiene with extracoronal attachments and patients need to be instructed on the use of hygiene accessories. Keeping the underside of the attachment area clean, greatly improves the tissue response.

CONCLUSIONS

In the coming years, the number of patients with partial edentulism will rise along with the need for cost-effective treatments such as RPDs. Removable partial dentures will continue to be one of the primary methods used to restore missing dentition for the foreseeable future.

Proper evaluation of the dentition state, tooth position, abutment preparation, adapting structures within the RPD, patient education, timely recall, and maintenance are only a few of the steps required for success. Treatment of the partially edentulous patient has become increasingly sophisticated in recent decades and when this treatment is planned and executed properly existing dentition and associated structures will be preserved and the treatment will last the life of the compliant patient.

Complications and treatment failures may occur with RPDs, and rigorous research is needed to examine the strengths and weaknesses of different RPD designs and new techniques and materials.

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Clinical and radiographical evaluation of an paste of calcium hydroxide - iodoform in the treatment of chronic periodontitis

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Abstract

Because endodontic pathology is caused due to bacterial contamination of the root canal system, endodontic treatment should focus on eliminating microorganisms in root canals. Germs removal from endodontic system is achieved both by instrumentation, accompanied by the use of endodontic irrigants and in precise situations, by interposing intracanallary medication. The chemical's antiseptic properties of iodoform were first discovered in 1880, which made it medically quite important. Calcium hydroxide is an antiseptic due to OH ions which can diffuse into dentinal tubules in both the infected and the periodontal space, directly acting on microorganisms.

The objective of this study was to evaluate the clinical and radiographic action of a calcium hydroxide-iodoform paste in chronic apical periodontitis.

Keywords: endodontic treatment, calcium hydroxide-iodoform paste, chronic apical periodontitis.

INTRODUCTION

Iodoform is a yellow hexagonal crystals of characteristic color and flavor, unpleasant and persistent, very poorly soluble in water, used in medicine as antiseptic, anesthetic, scarring, etc. [1]. The iodoform resulting from complexation of iodine with a non-ionic surfactant has antiseptic and disinfectant action (by iodine) and cleansing (by detergent). The effect is maintained in the presence of biological products.

Iodoform is primarily used to treat minor skin conditions due to its antiseptic properties. It is also used in various human and animal disinfectant products, and in polarizing films for liquid crystal display (LCD) chemicals.

Iodoform, which is a yellow solid organic halogen compound, was first discovered in 1822. Also known as triiodomethane, iodoform is manufactured by electrolysis of an aqueous solution that contains sodium carbonate, acetone and inorganic iodides. The chemical's antiseptic properties were first discovered in 1880, which made it medically quite important. However, in more modern times, iodoform is not used as frequently due to the discovery of more effective chemical antiseptics.

Another reason that iodoform is no longer as commonly used in medical treatments is that it carries a slight risk of poisoning. Excessive amounts of iodoform that are absorbed into the skin or ingested can lead to systemic intoxication, which could cause symptoms such as vomiting, rapid pulse, hallucinations, delirium and fever. Iodoform poisoning has the potential to even lead to a coma or death. When ingested or absorbed into the skin, iodoform has also been known to cause vision impairment and possibly total blindness, although the vision usually slowly improves on its own over time.

It is recommended for routine use as a disinfecting root canal dressing between office visits to prevent flare-ups and for treatment of infected root canals, abscesses, periapical lesions, perforations, exudation, root resorption, traumatic injuries, and for apexification and apexogenesis.

Pulp therapy helps to preserve the tooth until it is exfoliated when the dental pulp in deciduous parts is compromised by cavities, dental trauma or other factors. One of the factors that can contribute to the success is the material used in the obturation, to avoid the presence of microorganisms and ensure a hermetic seal of the conduits without hurting the successor piece or avoiding affecting the health of the patient [2].

Calcium hydroxide in a saturated, ionic dissociation solution with release of hydroxyl ions (OH-) and Ca2 + ions, with a pH between 12.5 and 12.8 [3]. He stimulates calcification, activating reparative processes by osteoblastic activation, by increasing the pH in adjacent tissues [2]. It is antibacterial because the pH conditions lower the concentration of hydrogen ions and inhibit the enzymatic activity of the bacteria. It can sterilize up to 88% of the root canals [2].

Iodoform is a resorbable substance, radiopaque, easy to handle and does not produce changes in the dental germ of the successor piece. It is considered that it is tolerated in the periapical even in large overlaps [3]. One of the presentations used for almost a century is in the form of paste combined with calcium hydroxide and camphor chlorophenol [3]. The use of oily vehicles to transport calcium hydroxide generates a low solubility and low diffusion capacity in the tissues, in which the ionic dissociation does not occur, so that the effect of calcium hydroxide would be zero. Therefore, some authors consider that using an oil as a vehicle would be an error. Chemically it is impossible to measure the pH of an oil, since they do not allow the dissociation of H+ and OH ions, confirming the incompatibility of $Ca(OH)_2$ [2].

Aim and objectives

The objective of this study was to evaluate the clinical and radiographic action of a calcium hydroxide iodoform paste in chronic apical periodontitis.

MATERIALS AND METHODS

Patients who experienced one of the following clinical symptoms were enrolled in the study: pain, fistula. Prior to the start of the treatment, radiological investigations were performed. All patients signed informed consent. Provisional obturation of root canals with calcium hydroxide iodoform paste was applied until the painful symptomatology or fistula suppression was resolved.

Clinical protocol:

1. Contact anesthesia with Lidocaine 2% followed by infiltrative anesthesia based on articaine with adrenaline 1/100000
2. Absolute isolation of the operative field with rubber dam (Figure 1)
3. Access to the pulp chamber (Figure 2)
4. When the pulp chamber is exposed and free of decay, it is irrigated with 5.25% sodium hypochlorite and dried with sterile cotton swabs
5. Manual mechanical instrumentation to the canals and length measurement using apex locator (Figure 3)
6. Between a file and another of a wider caliber, the canal is irrigated with 2% or 5.25% sodium hypochlorite.
7. Once the instrumentation is finished, it is dried with paper tips of the same number as the last file with which it was instrumented
8. Closure of the root canals with iodoform calcium paste (Figure 4). It is carried to the canals with lentulo carrier, placing a stop half a millimeter less than the measurement used to implement.
9. Obturation of root canals with gutta after remission of pain or fistula.

Figure 1. Isolation of the operative field with rubber dam

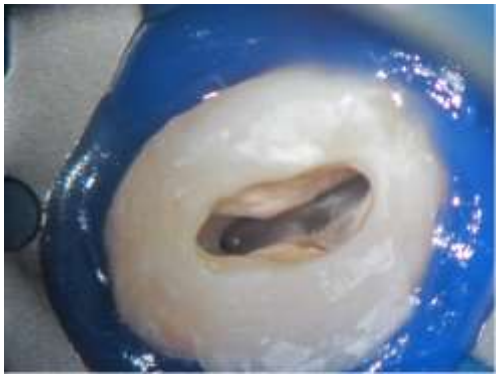

Figure 2. Access to the pulp chamber

Figure 3. Manual mechanical instrumentation to the canals and length measurement using apex locator

Figure 4. Iodoform calcium paste used in the study

RESULTS

The purpose of using calcium hydroxide-iodoform paste is to reduce the bacterial load in the endodontic system, combat microbial proliferation between treatment sessions and prevent recontamination.

The iodoform calcium hydroxide paste was maintained in the root canals for approximately 75 days, after which each case was radiologically evaluated (Figures 5,6). In mostly cases intermediate treatment was a success. Even if the radiological appearance was not improved, after this period the endodontic space was filled.

Figure 5. Tooth 37 after 75 days of treatment with calcium hydroxide-iodoform paste, and the beginning of treatment at 36, after remission of the painful symptomatology at the second molar

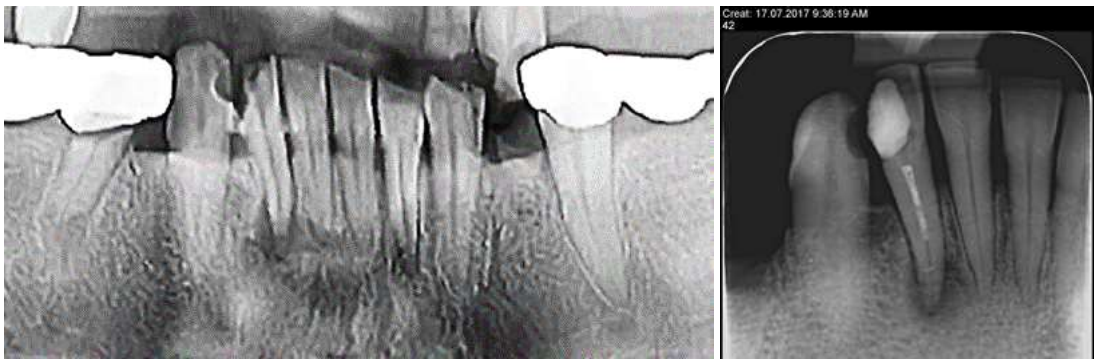

Figure 6. Tooth 42 after 75 days of treatment with calcium hydroxide-iodoform paste. Radiologically, the periapical lesion persists

The risk of such intermediate treatment is that some patients "forget" to return to the office (Figure 7).


Figure 7. Tooth 12 after 1 year and 7 months. Calcium hydroxide-iodoform paste was completely resorbed

DISCUSSIONS

Because endodontic pathology is caused due to bacterial contamination of the root canal system, endodontic treatment should focus on eliminating microorganisms in root canals. A number of materials have historically been used in endodontic treatments, but unfortunately, none of these have been able to satisfy the total requirements of an ideal sealer [4-6].

Many studies indicate the use of calcium hydroxide as an antiseptic in cases where a root canal is infected due to OH ions which can diffuse dentinal tubules in both the infected and the periodontal space directly acting on microorganisms [7-9].

Calcium hydroxide is an effective disinfectant material removing bacterium from root canals in necrotic teeth, as he stimulate calcification, in a way very clear. He activate reparative processes by osteoblastic activation, the increase in pH in the dental tissues, decreases edema and destroys the exudate, and generates a mechanical barrier apical scarring and sealed duct system [7,9,10].

Some researchers found favorable radiographic results at 6 months using 2 commercial pastes with iodoform, one with calcium hydroxide and another with zinc oxide (Vitapex® and Metapex®), in the treatment of temporary teeth. [10].

Prior to performing the root canal final filling, it is necessary to obtain a dentin surface completely released from the calcium hydroxide-iodoform paste residue, to allow an optimal adhesion of the sealant to the lateral walls of the root canal [11-13].

CONCLUSIONS

Endodontic treatment is today among the most demanded dental procedures. In addition to eliminating the pain caused by various factors, it is also a perfect alternative to save a tooth from extraction. A saved tooth can be used successfully in prosthetic or orthodontic treatments, and can make a difference between a fixed prosthesis and a mobilizable one.

Intermediate treatment with calcium hydroxide-iodoform paste may be a way to gain patient confidence in successful endodontic treatment in apical periodontitis with very painful symptoms.

Provisional obturation of the root canals with calcium hydroxide-iodoform paste was clinically and radiographically successful, in mostly cases. The study should be extended in the long term and compared with other techniques.

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The prevalence of Epulis-like tumors in the Western part of Romania

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Abstract

Objectives: Since this particular pathology, has a very high complexity, it's important to get an idea of the frequency of various clinical forms in our region and possible correlations to other aspects. The aim of the present study is to determine the prevalence of various pathological entities which interests the hyper-dimensioning of the gums on different categories of patients.

Materials and methods: We performed histopathological examination of biological samples from a group of 60 patients from the Oral and Maxillofacial Surgery Hospital in Timisoara, which were diagnosed with gingival hypertrophy.

Results: Most of the histopathological examinations confirmed the primary diagnostic and the most affected category of population was the elderly and urban one, with 75% of the patients coming from an urban area.

Discussions: It is difficult to establish exactly the reason for the big difference between rural and urban population. On one side it could be the pollution and the processed food more available in the urban areas are linked to the epulis-like gingival tumors, but on the other hand, the lower access to healthcare in the rural areas could let many cases undiagnosed and, so, untreated.

Conclusion: Epulis-like tumors have a high prevalence in Western Romania, especially for the categories previously mentioned – elderly and urban residents, but most of them are benign and can be treated successfully by an oral surgeon.

Keywords: Epulis, gingival tumor, oral surgery

INTRODUCTION

Epulis is a generic term used to describe a gingival tumor. There is a classification of epulis based on the etiology and location.

Gingival enlargement is an important chapter of oral pathology due to its high frequency, complex clinical appearance and multiple etiological factors, which many times makes the diagnosis difficult[1, 2, 3] This paper wants to determine the prevalence of epulis-like tumors among the maxilla-facial patients and possible correlating factors.

As a general rule, we must differentiate between gingival hypertrophy – the increase of the cell volume, and hyperplasia – the increase in cell number. Both types of gingival growth can lead to gingival tumors, but have different histological proprieties[4].

The etiologic factors are very complex and it's many times hard to establish exactly what cause the gingival hyperplasia.

Drug induced gingival hyperplasia is one of the most common one. Many drugs have this secondary effect on patients, such as anticonvulsants, immunosuppressants, and calcium channel blockers[5, 6, 7, 8, 9, 10].

Another important etiological factor of gingival enlargement is represented by the congenital disorders. Even though the congenital epulis of the newborn is an extremely rare condition, it may lead to mechanical obstruction, therefore resulting in respiratory distress and difficulty in feeding[11, 12, 13, 14].

Prosthetic related epulis is also a major part of the pathology, the so-called Epulis Fissuratum, which affects mostly elderly patient wearing complete dentures, usually ill fitting. This type of gingival enlargement greatly hinders mastication and produces discomfort and pain to the patient, and has the capacity of growing to impressive dimensions. The treatment is most of time surgical and, if performed correctly, has a high success rate[15, 16, 17, 18, 19].

Many patients come periodically to the Oral and Maxillofacial Surgery Hospital of Timisoara with different type of gum or oral mucosa tumors. Some of them are diagnosed immediately and, afterwards, scheduled for surgical removal, receiving the histopathological results days after the surgery. Other category of patients need a biopsy analysis first, before the main surgical procedure, especially the cases where the diagnosis is not clear from the clinical consultation. Nevertheless, all cases of removed tumors will go through the process of histopathologic analysis at some point. The present study was done based on multiple histopathological examination results recorded in Timisoara's hospital.

MATERIALS AND METHODS

We created a database with all the patients from the oral-maxillo-facial hospital in Timisoara diagnosed with gingival hypertrophy and/or tumors and. The total number of patients in the initial database was considerably higher, but the patients whose histopathological results were inconclusive or questionable were removed from the study. Finally, we only kept the lot of patients where the histological examination of a diagnosis was certain, in accordance with the purpose.

The average age of the group of patients was 61 years, close to the median values of 61.5, 60. The survey has a confidence level of 95% and a standard deviation of 14.

Pathologies identified and included in the study were: non-odontogenic jaw cysts, odontogenic cysts, fibrous epulis, epulis fisuratum, granulomatous epulis, irritation of the fibroma, papilloma, gigantocelulara tuberculosis, malignant tumor and seborrheic warts.

Table 1. Relative frequency analysis in the lot

Row Labels	
Non-odontogenous Jaw Cyst	1
Odontogenous cyst	2
Fibrous epulis	6
Epulis Fisuratum	15
Gigantocellular epulis	5
Granulomatos epulis	21
Irritation fibrome	3
Papillom	3
Squamous papillom	1
Gigantocellular tuberculosis	1
MALIGN tumor	1
Veruca Seboreica	1
Grand Total	**60**

RESULTS

Firslty, all the tumors and gingival hyperplasia cases were sorted out according to their histopathological diagnosis, for the complete lot of patients.

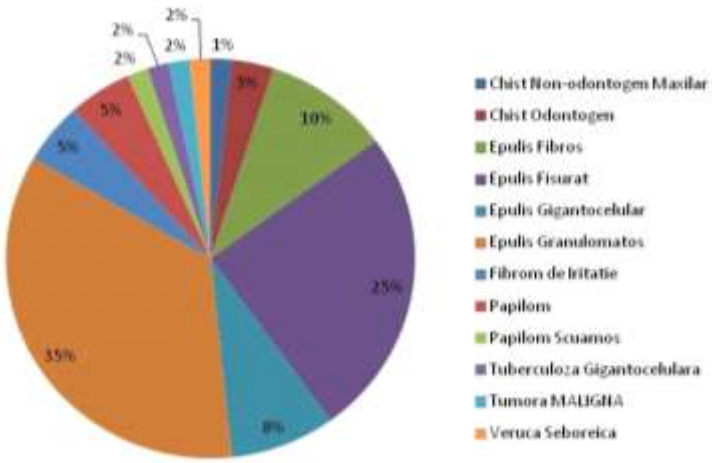

Figure 1. The relative frequency of diagnosis in the lot

The increased prevalence of granulomatous epulis and the fibrous can be seen, they represent more than half of all gingival hypertrophies. On the next two places there is the fibrous epulis and the giganto-cellular. These four particular types of epulis make up two-thirds of the entire gingival hypertrophy pathology, the others affecting the population sporadically.

Also, it is interesting to note that the epulis Fissuratum has the larger share - a condition strictly related to dentist profession. In this pathology, as we have shown in the paper, chronic irritation occurs from wearing bad fitted dentures. Although in many cases we have to deal with older patients that postpone to readjust the prothesis, or even to acquire a new one, there are situations when such lesions are quite iatrogenic.

After the first step, the incidence on male and female patients was established, as follows.

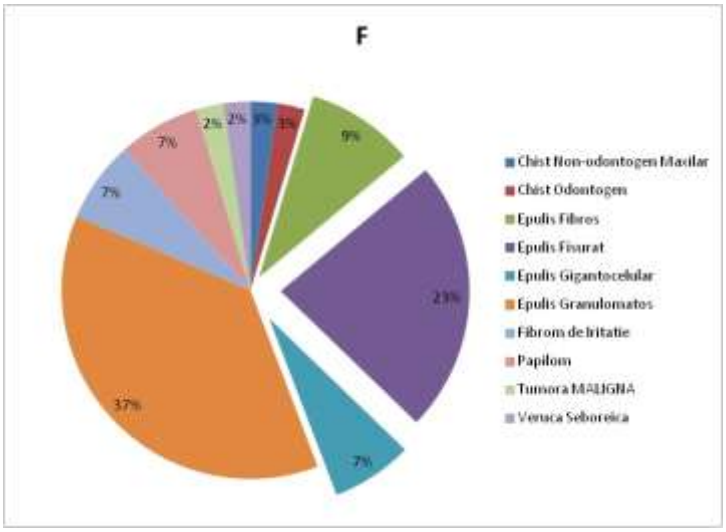

Figure 2. The relative frequency of pathology in women

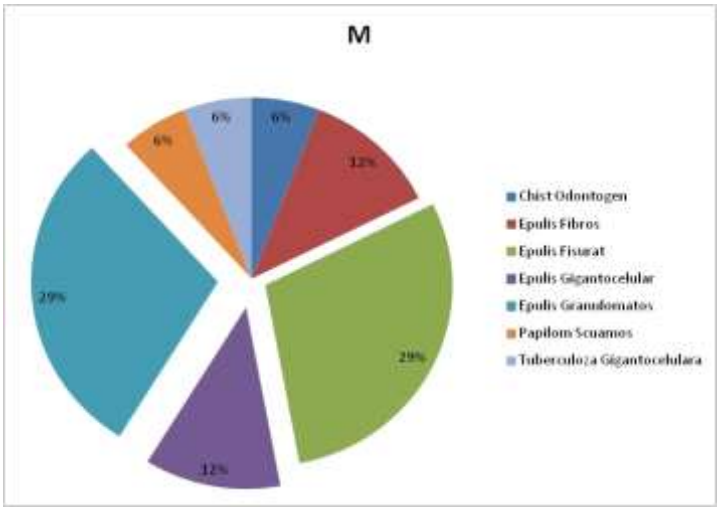

Figure 3. The relative frequency of pathology in males

Although some differences are found between the two groups, the basic trend is retained, and the epulis gingantocelular and epulis Fissuratum are the most common disorders in both sexes. Hence we may conclude that the preliminary hormonal arrangement, different between the sexes, plays a secondary, minor role in the appearance and/or development of epulis-like tumors.

The next analysis was focused on the age groups of the patients.

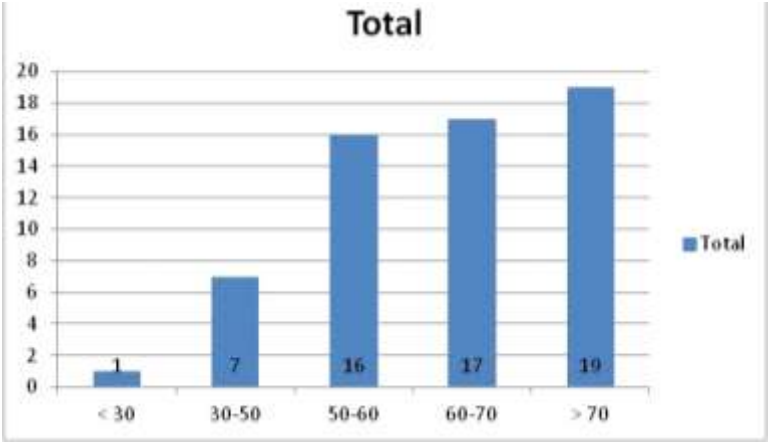

Figure 4. Relative frequency according to the age

From this graphical representation it's easy to observe that the pathology frequency increases with age, the highest point being the category of patients over 70 years.

The last objective of our study was to establish the difference between rural and urban patients, and the results were somehow unexpected.

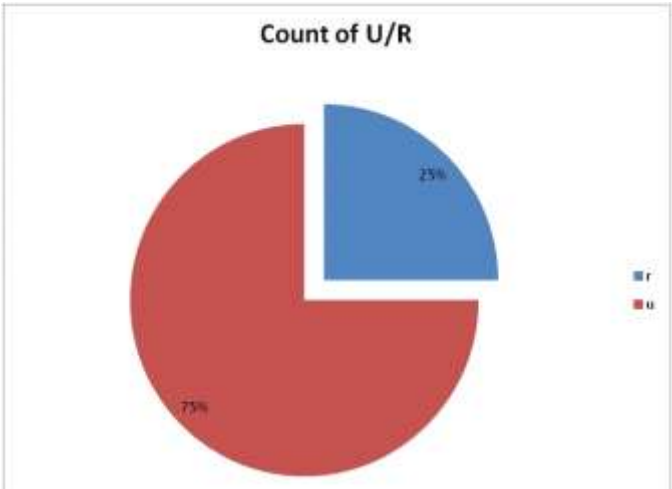

Figure 5. Frequency depending on the environment of origin

From this chart a big difference can be seen between the two groups of patients, those from urban areas making up about 75% of the total.

DISCUSSIONS

The gum related pathology is a vast chapter in dentistry and oral surgery. Because of the multitude of forms - clinical and etiological, and due to the treatment procedures, which are often very delicate, this pathology is still a challenge in oral-dental medicine.

Study results presented above are comparable to other existing studies:

In a study of oral lesions conducted by Kuwait University Dental Center[20], the proportion of elderly patients (50-60-70 years) is overwhelmingly higher than in other age groups, similar to the findings in this paper.

According to Parsa Atashrazm[21], 20 out of a total of 201 institutionalized denture carrying patients, a rate of over 16%, had epulis fissuratum. One possible explanation for the achieved lower results, compared to the study conducted in this paper, is that institutionalized patients take part of regular medical checkups, being able to highlight the need to change / adapt dentures before having lesions, unlike other edentulous patients who can ignore such local irritation for a long time.

One major question comes up more than other after analyzing the results though: Why is the frequency of gingival hyperplasia so high in urban areas, compared to the rural ones? Some explanations/possible hypotheses would be:

- Increased conscientiousness in patients from urban areas to access healthcare compared to those in rural areas, who may prefer to seek alternative treatments, so-called "empirical remedies", thus remaining undiagnosed.

- The urban environment is not as healthy as the rural one, and the consequences of this do not bypass the oral cavity. From the industrial pollution, to processed food and the alert, stressful lifestyle, all these factors influence the homeostasis and wellbeing of our body. So, in this context, it does not seem a misplaced assumption to take the general factors into consideration.

CONCLUSIONS

What is clear from existing studies to date is that gingival hyperplasia is one of the most common lesion of the oral cavity, its main etiology being represented by the local irritating spina. The most affected category of patients is the elderly ones over 60-70 years. The epulis-like tumors mainly affect denture wearers, the elderly, especially females.

Obviously, as with other systemic diseases or oral ones, it's not safe to talk about a single causative factor. Besides the main factor, which is the local irritant, a number of other factors can influence the reactivity of the body and, thus, the progress of the disease. As discussed previously in this paper, stress, hormonal changes, lifestyle, immune system and medication, all of which directly or indirectly affect their status in the oral cavity. Under these circumstances a multidisciplinary approach is the correct decision.

The rate of malignancy of these formations is very low, but should not be neglected due to significant volumetric expansion that may occur. The treatment of such a pathological process is not only the surgical removal of the tumor, but also the elimination of the causes and risk factors.

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Means for preventing the accumulation of bacterial plaque in patients undergoing orthodontic treatment

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Abstract

The bacterial plaque is a microbial ecological system, well adapted to the oral cavity environment, with a mixed character, saprophyte, with intense metabolic activity. In the present paper we aim to highlight and systematize the main mechanical means of assuring the oral hygiene of the orthodontic appliances: manual orthodontic brush, single toothed toothbrush, manual dentifrice introduction into the cleaning spaces, dental floss for brackets, oral shower, silicone toothpicks, gingival cone, orthodontic protection wax. We also want to point out the techniques of using these devices and materials because we find that patients and even physicians do not know these aspects.

Keywords: bacterial plaque, orthodontic treatment, oral hygiene.

INTRODUCTION

The bacterial plaque is a microbial ecological system, well adapted to the environment offered by the oral cavity, with a mixed character, saprofit, with an intense metabolic activity. It is presented as a mucoglycoprotein layer, strongly adherent to the dental surfaces, which cannot be removed by water jet or simply by rinsing. The bacterial plaque may also be present in other areas of the oral cavity, such as the areas of obturations, fixed or mobile prostheses, orthodontic appliances or endosal dental implants.

This system represents an important pathogenic potential for both the dental hard tissue and the marginal periodontitis. In fact, bacterial plaque is the primary etiologic factor for both for the carious and periodontal disease [1, 2].

By temperature, humidity, pH, the wide variety of nutrient substrates and aerobic and anaerobiosis conditions, the oral cavity provides ideal living and multiplication conditions for the bacterial plaque microorganisms, most of which are acidogenic.

MATERIALS AND METHODS

The control of the bacterial plaque is of two types, namely, a mechanical control performed by the gingival-dental scrubbing, the auxiliary oral hygiene methods and professional hygiene and the chemical control, made by toothpaste, oral mouthwashes and the use of in certain situations, of gels with elevated concentrations of chlorhexidine or fluorides [2].

The term gingival-dental brushing is used in the recommendations given to the patients precisely in the idea that they must be aware of the importance of removing the dental plaque and of the free gingival margin, not just on the dental surfaces accessible to hygiene by brushing, which are three out of five (vestibular, oral and occlusal). The two dental surfaces inaccessible to the toothbrush under the conditions of the inter-dental contact points, namely, the proximal surfaces, are dedicated to the auxiliary oral hygiene methods. Attention is also paid to the oral mucous hygiene, the gingival and dental brushing ending by cleaning the dorsal face of the tongue (Figure 1) [2, 3].

Figure 1. Tongue cleaner

The gingival-dental brushing, either manually or electrically, should be done in the morning, in the evening before going to bed and after each main meal. It is recommended to use soft, fine toothbrushes in both normal and electric versions [3].

There are hand brushes specially designed for fixed orthodontic bearers with a specific design in the sense that they have longer striped bristles on the edge and several shorter bristles in the middle so as to effectively remove food residues and dental plaque from the

brackets, without damaging the gingival tissue. As the brushing technique of the dental vestibular surfaces on which the fixed orthodontic appliance elements are applied, it can be indicated the use of circular or antero-posterior movements of the active end of the toothbrush, initially oriented at an angle of 45 degrees to incisal, but passing to the level of the gingival channel, followed by circular or antero-posterior movements oriented to 45 degrees but to the apical, thus systematically sanitizing both the dental surfaces and the marginal periodontium and also the brackets, in a clockwise manner (Figure 2). It is then systematically continued to brush the other dental surfaces prior to the application of the orthodontic device [3].

Figure 2. Brush technique recommended during fixed orthodontic treatment

For the hygiene around the orthodontic rings, a special type of brush with a small active head can also be indicated to remove the dental plaque from the hardly accessible distal faces of the last molars present on the arches, at the level of the forks, around the dental implants, or during the rash of the wisdom molars (Figure 3) [3,4].

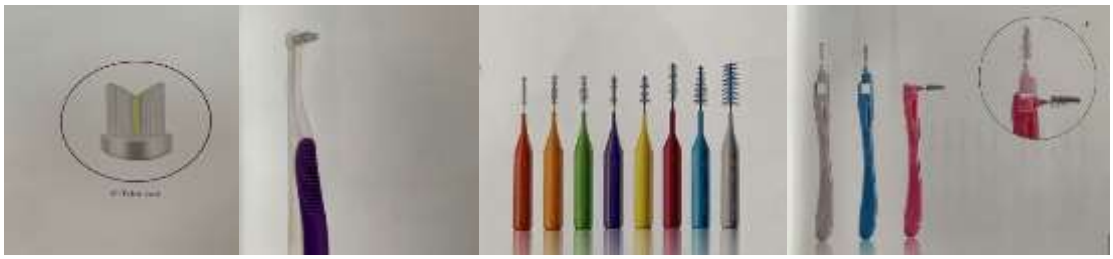

Figure 3. 3A – Design of manual orthodontic brush Fig. 3B,C,D-Different types of interdental toothbrushes

The proximal dental surfaces are sanitized by inter-dental toothbrushes, dental floss and mouthwash [4].

The inter-dental toothbrushes, in the case of patients with fixed orthodontic appliances, is used as follows: in order to remove the bacterial plaque from the proximal dental faces, they are passed under the orthodontic arch, from the incisal/occlusal to the apical, making several vertical movements, the fibers of the toothbrush cleaning also the lateral surfaces of the brackets. These are also indicated for vestibule-oral hygiene, being passed under the inter-dental contact point. For the classic indication of inter-dental toothbrush use, the patient must pay attention to the size of the toothbrush used in the sense that it must respect the space below the contact point without damaging the gingival papilla, that is, not being over or under-dimensioned. The cylindrical shape of the inter-dental toothbrushes is preferred (Figure 4) [5].

Figure 4. Technique of use of interdental toothbrushes in order to sanitize the proximal areas under the orthodontic arch

The hygiene of the proximal surfaces with dental floss is possible in the case of patients with fixed orthodontic appliances by means of a specially designed device that allows one of the ends of the floss to pass under the orthodontic arch, the subsequent movements being printed therein being the ones known, from the top to the bottom, in contact with the proximal dental surfaces up to the gingival trench, or a special type of dental floss can be used. Waxed and fluoridated dental floss is indicated to increase the dental hard tissue resistance to acid attacks following to the bacterial metabolism (Figure 5) [2, 4, 5].

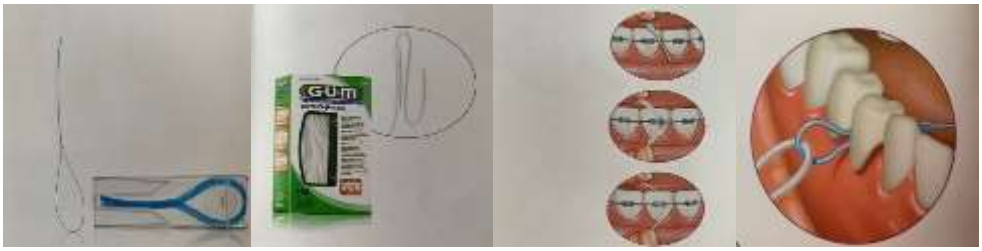

Figure 5. 5A – Silicon device with special design for inserting the dental floss under the orthodontic arc; 5B – Dental floss with special design for hygiene around the brackets;
5C – Recommended technique for sanitizing the proximal surfaces with dental floss;
5D – The technique of using the silicone device specially designed for passing the dental floss under the orthodontic arch or at the level of the prosthetic works

The oral shower (Figure 6) is perhaps the most effective way to remove the dental plaque from the proximal level, being very useful during the orthodontic treatment. By spraying under air pressure of the water introduced into the reservoir of the apparatus a removal of the comparable dental plaque is obtained as an effective result, or sometimes even more efficiently, compared to the dental floss [6]. It may indicate the insertion into the oral mouth of the mouthwash or a combination of water and mouthwash so that we have an improved chemical control of the dental plaque.

Figure 6. 6A – Oral (mouth) shower; 6B – Toothpicks with active side made of silicone and fluoride impregnated; 6C – Stimulator/Gingival cone used to remove the bacterial plaque from the gingival channel, forks, also having the role of massage and stimulation of the local gingival vasculature and keratinization of the gum

The toothpaste recommended at least during the orthodontic treatment will be one in which the composition will contain fluoride in various combinations, along with vitamins (E,

B5), herbal extracts (aloe vera), zinc oxide, arginine, pyrophosphates or zinc citrate with anti-tartar effect (Figure 7) [7].

Figure 7. Toothpaste containing cetilpyridine chloride and chlorhexidine in different concentrations (0.06% and 0.12

In some situations, when at the device activation sessions are held, a is noted a damage to the marginal periodontitis of microbial cause, which may need to indicate the use of a toothpaste with chlorhexidine, in a concentration of 0.12% until the clinical signs of gingivitis disappear. The combination in these cases of the oral rinses with chlorhexidine mouthwash in a concentration of 0.12% will be beneficial. The continuation of this protocol is indicated, but at lower concentrations of 0.06% chlorhexidine, but not more than 6 months, known as the exogenous pigments that chlorhexidine provides for long-term use. Some mouthwashes contain chlorhexidine (CHX) and cetylpyridinium chloride (CPC), an oral antiseptic with anti-fungal activity. The CPC exerts a local antimicrobial action that destroys the bacteria and fungi and to a small extent inhibits the development of viruses (Figure 8) [8,9].

Figure 8. Mouthwashes containing cetylpyridinium chloride and different concentrations of chlorhexidine (0.06% and 0.12%)

Of course, these changes in the recommendations for the practice of the individual oral hygiene will be applied after the professional sanitizing, which is usually done at 6 months or sometimes more often at 3 months, if signs of poor oral hygiene are observed during the active orthodontic treatment (Figure 9) [10].

Figure 9. Consequences of poor oral hygiene in a patient in orthodontic treatment

Occasionally, in the professional hygienic sessions, the plaque index is usually determined using a plaque revealer (Figure 10), when the patient is aware of the areas where

his/her teeth brushing is insufficient, then a supra and sub-gingival ultrasonic scaling, completed when needed with a manual brushing on certain areas and a professional brushing, using pastes with a low abrasive index, which can also be used to clean the hard dental surfaces and the airflow bracket surfaces [11]. At the end of these professional hygiene sessions it is recommended to apply a topical fluoridating agent to the dental hard surfaces and to motivate the patients to improve their personal oral hygiene.

Figure 10. 10A – Dental plaque revelators;
10B,C – Coloring the bacterial plaque with the identification of areas with poor hygiene

Patients with increased carious sensitivity may be advised for certain periods of time to apply chlorhexidine or fluoride gels to the dental surfaces, in various combinations and concentrations, but given the existence on the dental surfaces of the fixed dental device component elements, there will be indicated only the products applicable by dental brushing and not those applicable in the case of mouth guards. The recommended concentration of chlorhexidine in gels is 1%, and for the fluorine-based gels or fluids, the combination of 0.4% tin fluoride or 1.1% sodium fluoride is recommended.

In the immediate period following the application of the fixed orthodontic appliance, the patients are also advised to use the protective wax against the possible micro-irritations that may occur in the jaw or labia mucosa (Figure 11). This protective wax is intended to cover the components of the fixed dental appliance until the irritations have been healed, then only if needed, in case of discomfort, until the scheduled dental activation session is scheduled [12].

Figure 11. Orthodontic protection wax (simple or aromatic)

CONCLUSIONS

- The bacterial dental plaque prevention means have a very important role during the orthodontic treatment, helping to prevent tooth decay and periodontal disease during this period of time.
- Motivating the patients to maintain an optimal oral hygiene will be done during the orthodontic device activation sessions, especially when clinical signs of gingivitis, gingival hypertrophy or hyperplasia, localized or generalized, are observed, the occurrence of localized demineralization areas in dental parcels or the appearance of carious lesions.
- Using and applying all the recommended means in the oral cavity daily hygiene routine, there are chances that these habits will persist after the orthodontic treatment, making sure that these patients have understood the idea that it is much easier to prevent than to treat.

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Do dental visits pattern or school performance influence oral health of the schoolchildren in Bucharest?: A pilot study

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Abstract

Time from the last dental check-up and the school performance may have influence in pupils' oral health. This is a pilot study developed on 46 schoolchildren from Bucharest aged 10 to 12 years. Clinical data were collected in school dental offices in order to compute the caries (according to ICDAS criteria) and oral hygiene scores (OHIS). Time from the last dental visit and school performance were obtained from a questionnaire especially designed for this study. The average values for the main scores were: DMFT = 1.50 [± 1.97] and OHIS = 1.39 [± 0.75]. Due to an abnormal distribution of clinical data and from the questionnaires the statistical method involved bivariate correlations (Kendall's Tau-B and Spearmen's coefficients). Some relations have been established between dental visit pattern, school performance and the oral health condition on the other hand ($p < 0.05$).

Keywords: dental visit, school performance, oral health.

INTRODUCTION

The relation between oral health and social condition is no longer a secret. Studies from all over the world revealed different social risk factors with impact in oral health status such as income, quality of life, social class, education, demographic characteristics, access to dental services [1 – 4]. Social condition of families or parents are also important in studies which involved children or adolescents [1,2,4 – 7].

While regular dental check-ups are associated with better oral health [8] there are not many studies that certify that school performance influence in somehow pupils' oral health. Moreover, some studies found the opposite effect: poor oral heath influence school performance [9] and others found absolutely no connections [10].

Few studies are developed in Romania, couple of them revealing some connections between oral health and social condition. Some links were established between life quality [11], parents' education or access to school dental services and oral health among schoolchildren in Bucharest [12,13].

This pilot study was designed to find some risk factors related to caries or poor oral hygiene on a sample of schoolchildren from Bucharest.

Aim and objectives

The aim of this study is to evaluate some risk factors (social or related to oral hygiene habit, nutrition or saliva parameters) who lead to a poor oral health. We analyzed in this paper the relations between oral health (caries and oral hygiene scores) and two social factors, namely the time from the last dental visit and the school performance. Therefore, the main objective of this paper is to evaluate if the oral health condition of some Bucharest schoolchildren is influenced in any way by the two social factors mentioned above.

MATERIALS AND METHODS

This pilot study was conducted on a sample of 46 schoolchildren aged 10 to 12 years, between December 2014 and January 2015. The study was designed for making some correlations between some oral health parameters including caries scores, oral hygiene scores, salivary parameters (pH, buffer capacity, colonies of Streptococcus mutans), oral hygiene profile, nutritional pattern, varies social items etc. In this paper are analysed the possible associations between dental visit and school performance, and caries and oral hygiene scores.

46 pupils from two schools in Bucharest were examined in the school dental offices. Examinations were performed using dental mirror and CPI probe with rounded tip. Clinical data were collected in a special paper assessment form as well with a specially designed questionnaire that included 21 questions about caries risk factors, oral hygiene, nutrition and social condition.

The caries scores used in this papers are:

- DMFT
- subgroups of DMFT score according to ICDAS criteria:
    - $D_{1-2}MFT$ (DMFT score which include only initial stages of caries - precavitated lesions)
    - $D_{3-4}MFT$ (DMFT score which include only caries lesions with enamel breakdown but no dentine present)
    - $D_{5-6}MFT$ (DMFT score which include only frank cavities due to caries with visible signs of dentine)
- main components of DMFT score:
    - DT – decayed teeth
    - FT – filled teeth

- MT – missing teeth due to caries

Clinical data about oral hygiene were collected using the simplified oral hygiene index (OHIS) developed on Ramfjord teeth.

For this paper we chose for analyse the questions no. 14 and no. 17 from the questionnaire, namely:

- "*14. When was the last time you visited your dentist?*". The responses were counted by calculating the time period between the moment of the last dental visit and the moment of collecting clinical data.
- "*17. What was the average of your marks from the last year of study*?". This question is for assigning the pupils' school performance. The responses were grouped in twelve categories: between 4 and 4.5, 4.5 and 5, 5 and 5.5, 5.5 and 6, 6 and 6.5, 6.5 and 7, 7 and 7.5, 7.5 and 8, 8 and 8.5, 8.5 and 9, 9 and 9.5, and 9.5 and 10.

The data were entered into a computer and analysed using IBM SPSS 20 processor, trial version. The caries and oral hygiene scores were exposed using mean, standard deviation and 95% confident interval. Evan the distributions were not normal, the mean was chosen for descriptive statistics because of its clinical significance. For testing the associations between caries and oral hygiene scores and the last dental visit and school performance (the responses to questions no. 14 and 17) we used bivariate correlations for non-Gaussian distribution, namely Kendall's Tau-B (τ) and Spearmen's (τ_s) coefficients.

The study had the approvals of the Ethics Committee of Bucharest "Carol Davila" University, Bucharest Hospitals and Medical Services Administration (ASSMB) and of the Bucharest School Inspectorate. At least one of two parents for every pupil involved in the study signed an inform consent form specially designed for this study and approved by the "Carol Davila" Ethics Committee.

RESULTS

From the 46 schoolchildren involved in this study, 19 of them were girls. We had in our sample 7 schoolchildren of 10 years, 18 of 11 years and 21 of 12 years.

The oral health status is represented by the caries (DMFT, D_{1-2}MFT, D_{3-4}MFT, D_{5-6}MFT, DT, FT and MT) and oral hygiene (OHIS) scores. The results including gender subgroups are shown in the table nr. I. Note that some of these results, such as mean values of the OHIS score and DMFT general score (total and by gender subgroups) were previously reported [14,15].

Table I. The caries and oral hygiene scores (average values ± standard deviation [SD])

	Girls	Boys	**Total**
D_{1-2}MFT (± SD)	2.47 (± 2.01)	2.48 (± 2.17)	**2.48 (± 2.08)**
D_{3-4}MFT (± SD)	1.47 (± 2.09)	0.96 (± 1.28)	**1.17 (± 1.66)**
D_{5-6}MFT (± SD)	0.63 (± 1.42)	0.48 (± 1.05)	**0.54 (± 1.02)**
DMFT (± SD)	1.58 (± 2.16)	1.44 (± 1.86)	**1.50 (± 1.97)**
DT (± SD)	1.00 (± 1.59)	1.19 (± 1.79)	**1.11 (± 1.70)**
FT (± SD)	0.58 (± 1.42)	0.26 (± 0.48)	**0.39 (± 0.97)**
MT (± SD)	0	0	**0**
OHIS (± SD)	1.50 (± 0.89)	1.30 (± 0.67)	**1.39 (± 0.75)**

The time since the last dental visit was reported at the moment when we developed the study (the moment when clinical data were picked up). The data are graphically shown in figure no. 1.

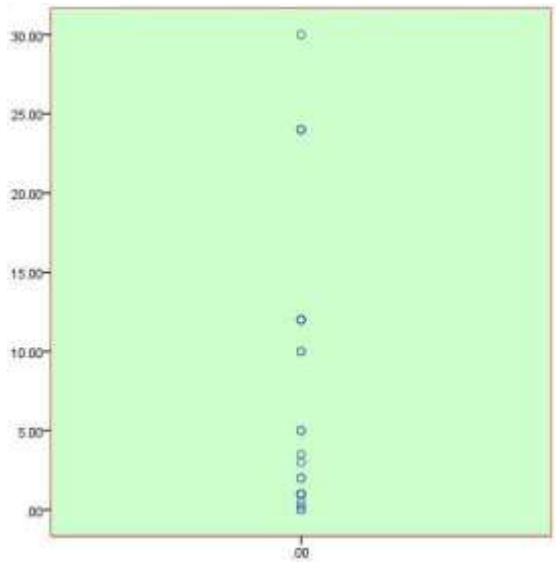

Figure 1. The period between the last dental visit and the moment when clinical data were collected (months)

The data concerning the average of the pupils' final marks from the last year of study are also graphically shown in the figure no. 2.

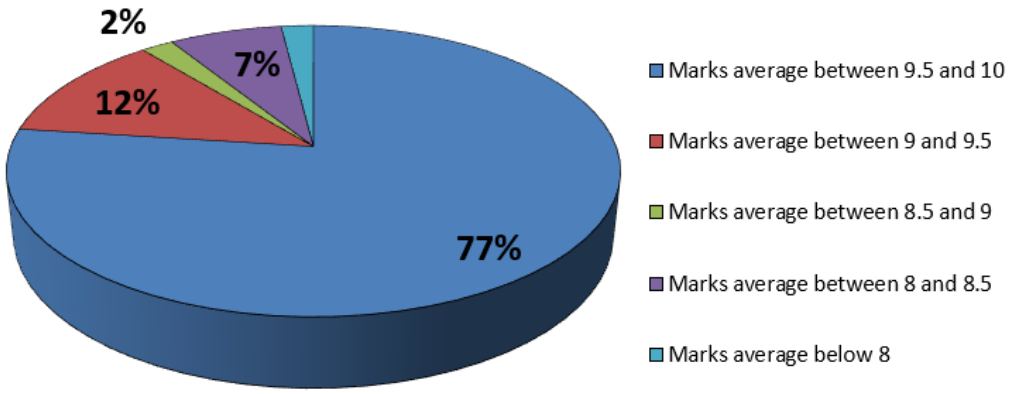

Figure 2. The average marks from the last year of study of the schoolchildren included in the sample

The correlation between all oral health parameters (caries and oral hygiene scores) and both, the time since the last dental visit and school performance were made using the correlation coefficients for non-Gaussian distribution. The results are shown in tables no. II and III.

Table II. The correlation between oral health scores and the moment of the last dental visit. * $p < 0.05$

Correlation coefficients		The moment of the last dental visit			
Kendall's Tau-B (τ)	Spearmen's (τ_s)				
DMFT		$\tau = 0.04$	$p = 0.780$	$\tau_s = 0.06$	$p = 0.743$
D_{1-2}MFT		**$\tau = 0.33$**	**$p = 0.013^*$**	**$\tau_s = 0.44$**	**$p = 0.009^*$**
D_{3-4}MFT		$\tau = 0.06$	$p = 0.645$	$\tau_s = 0.08$	$p = 0.656$
D_{5-6}MFT		$\tau = -0.04$	$p = 0.784$	$\tau_s = -0.04$	$p = 0.805$
DT		$\tau = 0.00$	$p = 0.986$	$\tau_s = 0.01$	$p = 0.955$
FT		$\tau = 0.09$	$p = 0.532$	$\tau_s = 0.11$	$p = 0.535$
OHIS		$\tau = -0.08$	$p = 0.542$	$\tau_s = -0.10$	$p = 0.572$

Table III. The correlation between oral health scores and the average of marks from the last year of study belonging to pupils included in the study.* $p < 0.05$, † $0.05 < p < 0.06$ (very closed to 0.005)

Correlation coefficients		The last year average marks of the			
Kendall's Tau-B (τ)	Spearmen's (τ_s)				
DMFT		**τ = - 0.25**	**p = 0.053†**	**τ_s = - 0.307**	**p = 0.043***
D_{1-2}MFT		τ = - 0.15	p = 0.221	τ_s = - 0.19	p = 0.203
D_{3-4}MFT		τ = - 0.21	p = 0.121	τ_s = - 0.24	p = 0.108
D_{5-6}MFT		**τ = - 0.35**	**p = 0.012***	**τ_s = - 0.38**	**p = 0.011***
DT		**τ = - 0.27**	**p = 0.046***	**τ_s = - 0.31**	**p = 0.036***
FT		**τ = - 0.29**	**p = 0.043***	**τ_s = - 0.31**	**p = 0.039***
OHIS		τ = - 0.04	p = 0.706	τ_s = - 0.06	p = 0.700

DISCUSSIONS

Even the schoolchildren included in this study had a moderate oral hygiene, the value of OHIS score was low. The DMFT score was also low, close to a half of the average value estimated to be on Bucharest schoolchildren population with age between 11 and 14 years [13]. However, being a pilot study with a very low sample we cannot jump any pertinent conclusion regarding the strict values of DMFT and OHIS scores. Most of the pupils involved in this study reported that the time from their last dental visit is below 5 month which is a short interval. Moreover, the average of their marks from the last year of study was very high, almost 89% of them reported an average over 9, which revealed a very good school performance.

Some of the correlations made between the different oral health scores and the two social parameters are significant ($p < 0.05$). The D_{1-2}MFT score which include only precavitated lesions of caries seems to be related with the moment of the last dental visit. The coefficients are positive, so that means: short time from the last dental visit is related with low value of D_{1-2}MFT. The dentist could contribute to a better oral health for the schoolchildren through education for oral hygiene. However, this sample has a very low DMFT mean value, which means that some of the significant differences between subgroups can be made only using D_{1-2}MFT score, because it includes only initial stages of caries and could be a more sensitive instrument [16].

The oral health condition had more correlation with the school performance, the coefficients being negative which means a good school performance is related with low values of caries scores. We obtained valid correlations with almost all caries scores, which mean a strong relationship between these two items. The element was also revealed by the Karki et. al. (2019) but they obtained exact the opposite effect in their studies. Their theory was that untreated dental caries and its consequences along with its clinical symptoms may lead to a poor school performance [9]. On the other hand, Quadry and Ahmad (2019) found no relation between those two elements but their paper seems to be more than a reply to work of other authors [10]. However, a good school performance means a good rate for schoolchildren to learn new information, normally including here information about oral hygiene.

The major limitation of our research is that being a pilot study, it has a very low sample of children which means that all correlations that we made may be not reflect the exact situation from the base population or can be consequences of some chance results.

CONCLUSIONS

It seems that this pilot study used a sample with children with good oral health, good school performance and high interest for dental check-ups. The time between the dental check-ups and the school performance seems to have some influence in oral health condition among pupils from Bucharest.

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The role of digital technology in virtual planning of orthodontic aligners

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Abstract

Digital technology has nowadays spread in all areas of dental medicine. Intraoral scanning and digital planning are now in the current use of orthodontic practice. The aim of this article is to describe the digital procedure that allows the orthodontist to communicate with the dental lab and to virtually plan each step of orthodontic aligner in a relapse case.

Keywords: Orthodontics, digital technology, virtual planning, aligners.

INTRODUCTION

Digital orthodontics has evolved worldwide through the years in all areas, from digital records, treatment planning, appliance design and production [1,2,3,4]. We can even treat complex cases with fully personalized orthodontic appliances. The digital treatment plan allows the clinician to virtually evaluate the treatment objectives and progress.

Since the introduction by Align Technology in 1997 of the first aligner system (Invisalign)[3], the demand for invisible orthodontic appliances has spreaded worldwide especially in adult patients. Nowadays there are hundreds of invisible orthodontic systems that can be used in order to treat the orthodontic patient with aligners, still the case selection is crucial in achieving the best clinical results [5,6,7,9].

MATERIALS AND METHODS

A 28 years old female patient presented to the orthodontist due to a small relapse after orthodontic treatment in her upper frontal teeth. Treatment options were presented to the pacient, and the chosen method was the aligner therapy.

The system used was Dental Corect, together with Maestro 3D software, that allows the orthodontist to virtually segment the model and to previsualise the corrected arches and occlusion. The case was a relapse after fixed orthodontic therapy and required 2 steps of aligners in order to correct the position and torque of 2.1.

The intraoral scan was sent to the digital laboratory (Dentavis) by digital communication. The lab made a virtual setup with two steps of 0.3 mm correction. The lab sent the virtual setup to the orthodontist. The clinician analysed the model and the setup and can also modify it. After the acceptance of the virtual setup by the patient, the orthodontist send the final accept to the laboratory and the models were 3D printed. The aligners were made with the help of a vacuumformed machine on the printed models.

Table 1. The Bolton analysis revealed a discrepancy beween mesio-distal dimensions of the upper and lower teeth

Bolton analysis	
Overall ratio	97.82
Anterior ratio	78.19

Table 2. Recommended Interproximal Reduction of the upper incisors

IPR Upper Jaw
21 [0.20 mm] - [0.00 mm] 11
21 [0.10 mm] - [0.10 mm] 22

Table 3. The total desired movements for correcting the upper teeth

Upper Jaw movements	
TIP	0^{0}
Rotation	3.1
Torque	0.61
Buccal-Lingual	0.18 mm
Extrusion-Intrusion	0.002 mm
Mesial-Distal	0.042 mm
Distance	0.18 mm
Nr of models	2

Table 4. Virtual planning for frontal upper group

Upper jaw – layer 1						
	Tip	Rotation	Torque	Buccal/Lingual	Extrusion/Intrusion	Mesial-Distal
13	0º	1.1 º	0 º	0mm	0mm	0mm
12	0 º	-2 º	-1.1 º	0mm	0mm	0mm
11	0 º	6,2 º	0 º	0.36mm	0mm	-0.059mm
21	0 º	5.2 º	0 º	0.07mm	0mm	-0.079mm
22	0 º	-0.086 º	-1.2 º	-0.01mm	0mm	0.043mm
23	0 º	0 º	0 º	0mm	0mm	0mm

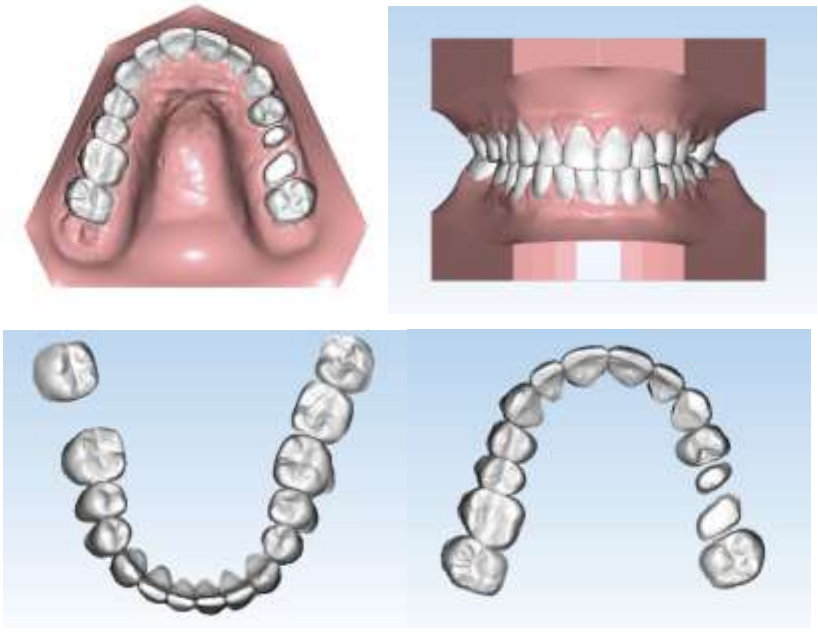

Figure 1. Steps in the virtual planning. Segmentation of each tooth in order to obtain the desired movement

The patient was instructed to wear full time the aligners, except during the meals. The two aligners were worn for about 2 months until achieving the expected result.

Figure 2. Initial position. A small malocclusion is visible in the upper frontal area

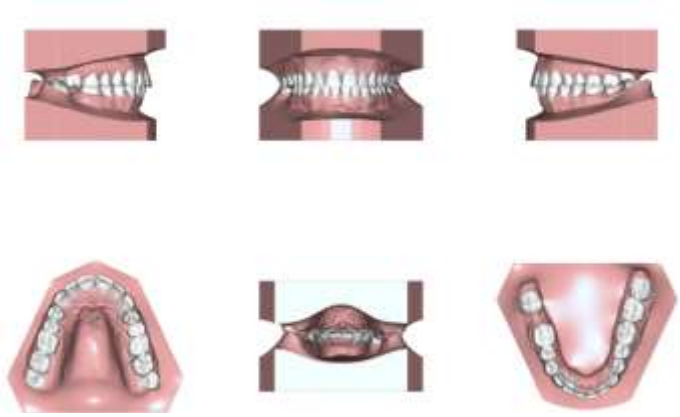

Figure 3. Final corrected position

DISCUSSIONS

It is important to understand that all the virtually planned orthodontic treatment needs to carefully respect the biological and functional aspects of tooth movement.

As esthetic demands in the society grow, the clear aligner therapy is demanded by a more significant number of patients. Some movements can be achieved with better outcome than others, as demonstrated by Kravitz in 2009. He revealed that lingual constriction can be easily obtain with aligners, while vertical movements such extrusion are difficult to achieve [8].

Recent studies have shown that high frequency acceleration devices can be used in conjunction with aligner therapy with very good results[10].

CONCLUSIONS

Customised aligner therapy can be used in orthodontic treatment from small to severe malocclusions. Further investigantions are required in order to clarify the accuracy of digital models and the applications of aligner therapy in all types of maloclusions.

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The interdisciplinary orthodontic approach of an oral cleft

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Abstract

Labiomaxilopalatal clefts are the second most frequent congenital malformation that affects 13% of the cases. They are characterized by the discontinuity of the upper lip, the alveolar and palatal processes of the maxilla or of the palatal veil. In 70% of the cases the cleft is unilateral and affects more often males and the left side.

Clefts can be classified according to the anatomical structures that are involved and whether it is on one or on both sides of the median structures.

The emotional status of the patient with a cleft and of its' relatives is affected because of the poor facial aesthetics and function, both of them being of high importance for a normal life.

In this case report we present the orthodontic, surgical and prosthetic treatment outcome of a patient with labiovelopalatal cleft.

Keywords: *cleft, labiomaxilopalatal cleft, orthodontic, surgical, prosthetic, function, aesthetics.*

INTRODUCTION

Labiomaxilopalatal clefts are the second most frequent congenital malformation that affects 13% of the cases. They are characterized by the discontinuity of the upper lip, the alveolar and palatal processes of the maxilla or of the palatal veil. In 70% of the cases the cleft is unilateral and affects more often males the left side.

Regarding the clasiffication of oral clefts, they can affect the craniofacial structures either unilaterally, bilaterally or in the median area. The bilateral clefts can be symetric or assymetric. The patients with clefts that involve the median structures don't survive this affection. Oral clefts can involve the lip, the alveolar process of the maxilla, the palatal process of the maxilla and the palatal veil.

The etiology of the clefts is, besides of the genetic factors and the genetic syndromes which accompanies, the environmental factors like viruses, radiations, drugs, steroid hormones and vitamins and aminoacids defficiency during pregnancy.[1]Other risk factors are the age of the parents (the chance increases by aproximately 57% inparents over 40 years old)[5] and maternal exposure to tobacco and alcohol use[6]. In other words, the lifestyle of the mother during the pregnancy period is not no be neglected at all.[2]Microbiological studies has shown that the neural crest cells are involved in formation of the craniofacial structures. In patients with clefts, these cells are unable to damage the free radicals and this way the aposition of bone in the craniofacial area is interrupted. [3]

In the oral clefted patients, not only the social life is affected because of the facial asethetics but also the vital functions like breathing and feeding.[4] Patients with clefts need special attention from their relatives regarding these problems because during early childhood the suction is insufficient and the milk regurgitates into the nasal cavity. Among the vital functions, they also present vocal distorsions and hearing problems. [7] As it concerns the dentition, cleft lip and palate is associated with some dental anomalies as supernumerary tooth, congenitally missing tooth, delayed tooth development, morphological anomalies in both deciduous and permanent dentition, delayed eruption of permanent maxillary incisors, microdontia, and abnormal tooth number.[8]

In this case report we present the orthodontic treatment of a patient with labiovelopalatal cleft and the final outcome.

CASE REPORT

Figure 1. Initial extraoral photographs

A 19 years old male patient presented in the orthodontic practice after having surgical procedures for solving the lip and palate cleft. The chief complaint of the patient was poor smile and facial profile among with unpleasant form of the incisors. He had a poor oral hygiene, with multiple caries and plaque.

The patient has a slightly oval assymetrical face with a deviation of the mandible to the right and a severe class III profile.

Figure 2. Initial intraoral photographs

The intraoral photographs reveal a narrow upper arch with an accentuated and assymetrical V form, assymetry of the lower arch with a constriction in the transverse plane in the 3rd quadrant that lead to the mild crowding. The patient also presents crowding in the upper arch, severe malocclusion with bilateral and anterior crossbite (except the molar regions), a very accentuated curve of Spee and a deviation to the right of the lower midline by 5 mm,bilateral class II molar and caninewith congenitally missing lateral incisors and microdontia of the central incisors.

Figure 3. Initial cephalometric radiograph

On the lateral ceph X-ray, in the sagital plane, the class III skeletal and cutaneous are obvious, along with the anterior crossbite. In the tables below, the measurements of the initial lateral ceph shown and reveal a retruded maxilla that is the cause of the skeletal class III.

The measurements also reveal that the lower incisors are retroclined on the mandibular plane and the upper incisors are proclined related to the cranial plane.

In the vertical plane, the patients shows to be a hypodivergent with the FMA angle of 20 degrees.

-1/FH	°	68	80	12	|●●●
FH/ML'	°	25	20	-5	●|
-1/ML'	°	88	80	-8	●●|
Angle SNA	°	82	64	-18	●●●|
Angle SNB	°	80	77	-3	●|
ANB	°	3	-12	-15	●●●|
Wits	mm	2	2	0	|
FH/OcP	°	10	-15	-25	●●●|
Z-Angle	°	75	82	7	|●
Upper lip thickness	mm	N/A	16	N/A	|●
Total chin thickness	mm	N/A	12	N/A	|●
Ar-tGo	mm	N/A	55	N/A	|●
Me/NL	mm	N/A	64	N/A	|●
Facial heigth index	%	70	86	16	|●●●

Figure 4. Tweed-Merryfield analysis on the intial lateral X-ray

Figure 5. Initial panoramic radiograph

On the panoramic radiograph, the missing lateral incisors and the dwarfcentral incisors are shown, as well as the missing third lower right molar.

Phases of the treatment plan:

1. Surgical intervention for solving the cleft before the patient presented to the orthodontic practice.
2. Orthodontic treatment for solving the malloclusion.
3. Surgical intervention for maxillary advancement (Le Fort 1).
4. Continuing with the orthodontic treatment for stabilizing the skeletal results.
5. Prosthetic restauration of the upper anterior teeth.

Treatment objectives

The objectives of the orthodontic treatment were to level and align the dental arch, to correct the lateral and anterior crossbite and to stabilize the occlusion. Other objectives of the interdisciplinary approach were to improve the facial aspect from the frontal but also from the lateral view. Enhancing the smile aesthetics was of high importance this way giving the patient more confidence and a better psychosocial life experience.

Treatment progress

The orthodontic treatment for solving the malloclusion was started in the upper arch with leveling, alignment and expansion in order to solve the lateral crossbite.

Figure 6. Initial photograph with the fixed appliance

Figure 7. Photograph after widening of the upper arch

Figure 8. Comparison between the upper arch before and after the widening process

The next step in the treatment plan was to intrude the palatal cusps by using two miniimplants (inserted between the premolars' roots), six buttons on the oral surfaces of the bicusps and first molars and elastic chains.

Figure 9. The two miniimplants inserted in the palace along with the six buttons and the elastic chains

Figure 10. Frontal and lateral intraoral photographs after the intrusion of the palatal cusps

The treatment was continued by using a palatal plate with an anterior bite block and class III elastics for solving the anterior crossbite.

Figure 11. Frontal and lateral intraoral view of the patient wearing the anterior bite block plate and the class III elastics

Figure 12. Intraoral and extraoral view of the anterior bite block plate

After the surgical advancement of the maxilla, the patient continued with the orthodontic treatment for stabilizing the results and at the end of the treatment, another lateral X-ray was done.

Figure 13. Initial and final lateral X-ray of the patient

Comparing the initial and final lateral X-ray, we can see that the value of the ANB angle has decreased from a value of -12 to -5 degrees, the anterior crossbite is solved with a normal overjet and the cutaneous profile has improved to a straight profile.

-1/FH	°	68	76	8	|••
FH/ML'	°	25	19	-6	••|
-1/ML'	°	88	85	-3	|
Angle SNA	°	82	71	-11	•••|
Angle SNB	°	80	76	-4	•|
ANB	°	3	-5	-8	•••|
Wits	mm	2	3	1	|
FH/OcP	°	10	-11	-21	•••|
Z-Angle	°	75	83	8	|•
Upper lip thickness	mm	N/A	13	N/A	|•
Total chin thickness	mm	N/A	11	N/A	|•
Ar-tGo	mm	N/A	57	N/A	|•
Me/NL	mm	N/A	68	N/A	|•
Facial heigth index	%	70	84	14	|••

Figure 14. Tweed-Merryfield analysis on the final lateral X-ray

The orthodontic treatment after the surgical maxillary advancement consisted of using intermaxillary elastics for reaching skeletal stabilization, detailing and finishing the occlusion.

Treatment results

At the end of the orthodontic treatment, the patient had in the sagital plane bilateral canine class II, molar class II on the right side and class I on the left side and an overjet of 1,5mm.

In the transversal plane, the crossbite was corrected with the agreement of the patient to not try to correct the deviation of the lower midline.In the vertical plane the anterior open bite was left to provide enough vertical space for the anterior rehabilitation of the dwarf teeth.

Figure 15. Intraoral frontal and lateral view of the patient at the end of the orthodontic treatment

Figure 16. Extraoral photographs of the patient at the end of the orthodontic treatment

Figure 17. Extraoral photographs of the patient at the end of the prosthetic rehabilitation

Figure 18. Initial, preprosthetic and final smile

DISCUSSIONS

Lateral and anterior crossbite is a common situation in patients with oral clefts due to the narrow and retruded maxilla. Solving this problem not only with the help of the fixed appliance but also with miniimplants, class III elastics and anterior bite block plate all of the treatment objectives were achieved. Therefore, the treatment can be considered a successfull one.

The orthodontic treatment in patients with clefts is mandatory for a satisfying outcome, as it is the surgical intervention for closing the defect and for advancing the maxilla. Nonetheless, the prosthetic part has a very big impact in the final results, giving the patients the self confidence they looked for.

CONCLUSIONS

Even though the treatment period is a long run, a well driven treatment plan with a multidisciplinary approach gives the stable outcome that patients need.

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Dental caries status of a group of 6-12 years old children in Romania

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Abstract

The aim of this study was the assessment of the dental caries prevalence, dental caries indices and oral hygiene indices in children of different ages. Material and methods: 2351 children, with a mean age of 8,41 ± 1,92 years, from 26 cities in Romania, enrolled in the program "Zâmbete Colgate", were clinically examined. 93,26% (N=2195) subjects were between 6 and 12 years old. Results: The prevalence of dental caries on permanent teeth increased with the age of children: from 14,45% among 6 years old children to 82,60% among 12 years old children. Moreover, dental caries indices increased with age: 6 years old children had a mean DMFS of 0,5 (SD=1,9) and DMFT of 0,34 (SD=0,81); 12 years old children had DMFS of 4,65 (SD=5,00) and DMFT of 3,67 (SD=3,17). There was a statistical significant correlation between OHI-s index and DMFS/DMFT indices. Conclusion: Dental caries is not only a common oral disease among children assessed but also affects a high number of teeth and surfaces, and the indices rise with age.

Keywords: dental caries, oral hygiene, oral health.

INTRODUCTION

Globally, despite the evolution efforts of public health services in prevention of oral diseases[1], dental caries continues to have a high prevalence among children, being among the 10 most common diseases in children[2], and there are inequalities between children coming from different areas and socio-demographic conditions[3] [1,2,3]. In Romania, the lack of consistent public oral health educational and prevention programs, many children suffer from dental cavities from early stages of life [4]. "Zâmbete Colgate" is a program implemented in 2017 in Romania as part of the "Bright Smiles, Bright Futures" program in Romania. "Bright Smiles, Bright Futures" is a global program which aims to educate and motivate children to adhere to a proper individual oral health behavior in order to prevent dental caries. In the last 25 years, this program reached more then one billion children from 80 countries. In order to adapt the dental services and oral health programs, it is important to have an updated perspective over the population oral health status.

Aim and objectives

The aim of the study was the assessment of the dental status of the children of different ages in Romania. For this purpose, oral examinations were performed to reveal the prevalence of dental caries, the mean number of teeth and dental surfaces affected by caries, the number of restorations for caries, the number of teeth extracted because of the dental caries and the oral hygiene level.

MATERIALS AND METHODS

The cross-sectional study took place between November 2017 and May 2018, in 20 cities in Romania. The sample group included 2351 children, 2 - 19 years old and a mean age of 8,41 ± 1,92 years. They were enrolled in the "Zâmbete Colgate" educational program and they agreed to participate also to the clinical evaluation. Children were assessed through oral examination performed by 65 examiner dentists, in the medical offices of the schools were the program took place, on mobile dental chairs, using disposable dental examination instruments and under proper light. The operators were trained and calibrated to perform standard examinations, using a clinical chart with sections for dental status and oral hygiene status. For the dental status evaluation, clinical parameters of interest included the presence of dental caries and the surfaces affected, presence and type of restorations, missing teeth as an evolution of the dental caries, in order to calculate Decay-Missing-Filled (DMFS/DMFT) indices. For the oral hygiene status evaluation, there were used the criteria for calculation of the Oral Hygiene Index Simplified (OHI-s), for assessment of both the presence and quantity of soft debris (Debris Index Simplified) and calculus (Calculus Index Simplified). Informed consent was obtained from subjects and the parents of minor children. The data collected was analyzed using IBM SPSS Statistics v19 software (Armonk, NY: IBM Corp).

Among the subjects enrolled in the study, temporary dentition was found at 92,51% (N= 2177) of the subjects while permanent dentition was found at 93,70% (N=2203) of the subjects. Also, 93,26% (N=2195) had the age between 6 and 12 years, which was the age range of interest.

RESULTS

Prevalence of dental caries

Prevalence of dental caries on temporary dentition was 78,96% (N=1719) while on permanent dentition the prevalence was 50,20% (N= 1106).

When the analyze of the data was performed only on the group of 6-12 years old subjects, the results showed that on the permanent dentition prevalence of the dental caries increases with age. Thus, at the age of 6 years, even if the prevalence was low, it revealed that 14,45% of the subjects already have dental caries on permanent teeth. The frequency doubles its value for 7 years old children (29,97%), increases to 51,86% for 8 years old children, affects two thirds of the 9 years old (64,33%) and 10 years old (65,55%) subjects, three quarters (74,65%) of children 11 years old and the highest prevalence was found at the group represented by the 12 years old children (Fig.1).

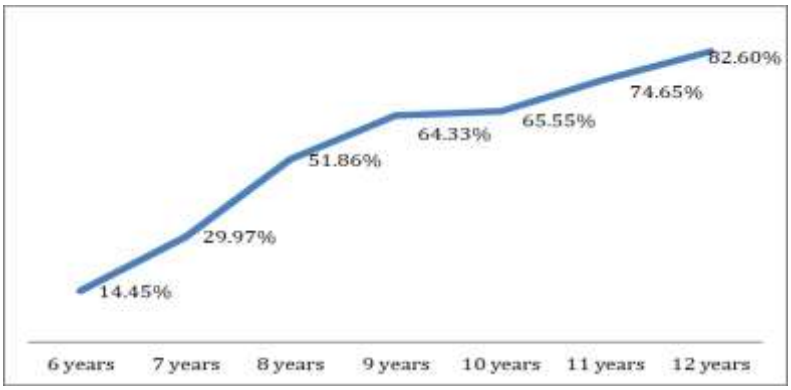

Figure 1. Prevalence of dental caries among children between 6 and 12 years of age

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Dental caries experience

For the group who had temporary dentition, the results showed a mean value for dmfs of 6,97±7,74 and for dmft of 3,62±3,05. When it comes to permanent dentition we found mean values of 1,87±2,88 for DMFS and 1,51±1,90 for DMFT.

Analyzing the results only for the group of subjects between 6 and 12 years, we observed that not only that the frequency of children affected by dental caries increases with age but also that the number of dental caries per children is higher as the children grow. The results regarding the mean number of teeth and surface with a history of dental caries affection show a constant and rapid evolution from 6 years old children, with a mean DMFS = 0,5±1,90 and DMFT = 0,34±0,81, to 12 yeas old children who have a mean DMFS = 4,65±5,00 and DMFT = 3,67±3,17 (Table 1, Table 2).

Moreover, the values of the DMF indices are given predominantly by the D component whose values increase from the 6 years old children (DS=0,46±0,88, DT=0,29±0,74) to the group represented by the 12 years old children (DS=4,48±4,92, DT=3,57±3,11) (Table 1, Table 2).

The number of restorations found in the sample was very low for all the age groups analyzed. On the other hand, in this sample only in the group of children of 10 years were found missing teeth because of the dental caries and their number was insignificant (Table 1, Table 2).

Table 1. DMFS for the population studied

	DS	Std. Dev	MS	Std. Dev	FS	Std. Dev	DMFS	Std. Dev
6 years	0,46	0,88	0	-	0,05	0,31	0,50	1,90
7 years	0,77	2,15	0	-	0,09	0,49	0,86	2,19
8 years	1,42	2,40	0	-	0,17	0,57	1,59	2,44
9 years	1,87	2,65	0	-	0,23	0,71	2,10	2,68
10 years	2,09	2,60	0,03	0,50	0,23	0,77	2,29	2,63
11 years	2,95	3,27	0	-	0,24	0,68	3,20	3,26
12 years	4,48	4,92	0	-	0,17	0,57	4,65	5,00

Table 2. DMFT for the population studied

	DT	Std. Dev	MT	Std. Dev	FT	Std. Dev	DMFT	Std. Dev
6 years	0,29	0,74	0	-	0,05	0,31	0,34	0,81

7 years	0,57	1,03	0	-	0,09	0,49	0,66	1,12
8 years	1,12	1,46	0	-	0,16	0,55	1,27	1,53
9 years	1,52	1,71	0	-	0,22	0,70	1,77	1,84
10 years	1,68	1,67	0	0	0,20	0,63	1,87	1,74
11 years	2,32	2,12	0	-	0,22	0,66	2,53	2,17
12 years	3,57	3,11	0	-	0,11	0,43	3,67	3,17

Oral hygiene status

The mean value of the OHI-s index for the entire sample was 0,94±0,87, which describes the level of oral hygiene for the group studied as good, and the predominant component is represented by the DI index which had a mean value of 0,79±0,66. Moreover, we found a statistically significant correlation between the OHI-s index and DMFS index (Pearson's $r = 0,192$, $p < 0,01$) or DMFT (Pearson's $r = 0,211$, $p < 0,01$)

DISCUSSIONS

Compared to recent previous similar studies recently conducted in Romania, the results in the present study show higher values of DMFS and DMFT and a higher prevalence compared to children in the capital city [5,6]. In the assessment performed in our study the lack of the additional investigations for caries detection (such as X-Rays) or for plaque accumulation (such as plaque disclosing solutions) might represent a limitation in the accuracy of the results. However, the results offer relevant details regarding the evolution of the dental caries level at different ages in children, which should urge preventive interventions.

CONCLUSIONS

In the present study, more than half of the children have dental caries which affect permanent dentition at a short time after eruption and the increase in prevalence and DMF indices is fast between the age of 6 and 12 years. Even though the oral hygiene index show a good oral hygiene, the poorer oral hygiene the higher number of dental caries.

Acknowledgment

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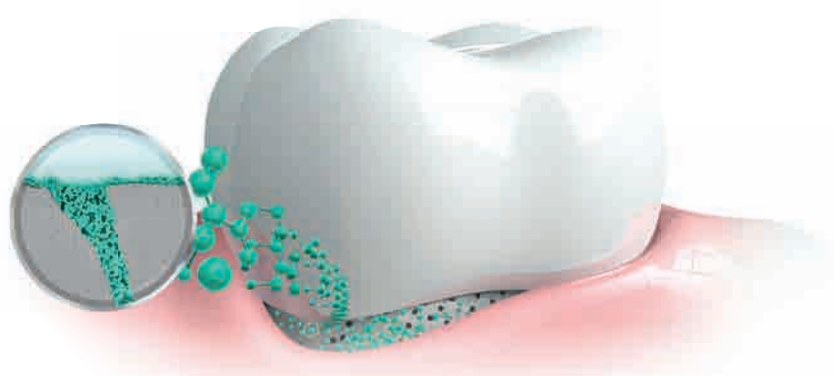
Noul elmex®SENSITIVE PROFESSIONAL cu tehnologia PRO-ARGIN

Calmarea **imediată* și de durată** a durerii din sensibilitatea dentară[1,2]



- În contact cu saliva, se formează un strat bogat în calciu, care obturează instant[1,*] tubulii dentinari deschiși
- Stratul rămâne intact în timp, chiar după expunerea la acizi, asigurând calmarea de durată a durerii din sensibilitatea dentară[2,3]

93% dintre pacienți confirmă calmarea durerii din sensibilitatea dentară[4]

93% dintre pacienți — confirmă reducerea hipersensibilității dentinare[4]

91% dintre pacienți — apreciază recomandarea medicului stomatolog[4]

Calmarea imediată* a durerii din sensibilitatea dentară[1]

Calmarea imediată* și de durată începe cu recomandarea dumneavoastră**

*Pentru calmare imediată, aplicați direct cu degetul pe dintele sensibil și masați ușor pentru 1 minut;
**Doar în legătură cu pasta de dinți

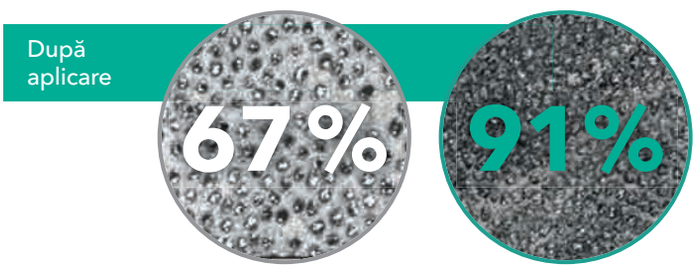
Referințe: 1. Nathoo S, et al. J Clin Dent. 2009;20(Spec Iss):123 –130; 2. Docimo R, et al. J Clin Dent. 2009;20(Spec Iss): 17– 22.; 3. Report Deon Hines-0003, 2016; 4. Studiu Ipsos cu privire la utilizarea produsului elmex® SENSITIVE PROFESSIONAL Repair & Prevent, efectuat în Polonia, rezultate după 2 săptămâni de utilizare, cu 325 de participanți (2017).

elmex® SENSITIVE PROFESSIONAL realizează obturarea superioară a tubulilor dentinari în comparație cu tehnologiile concurente[1,2,*]

Studiul 1[1,*]

Tehnologia cu fluorură de staniu/ fluorură de sodiu

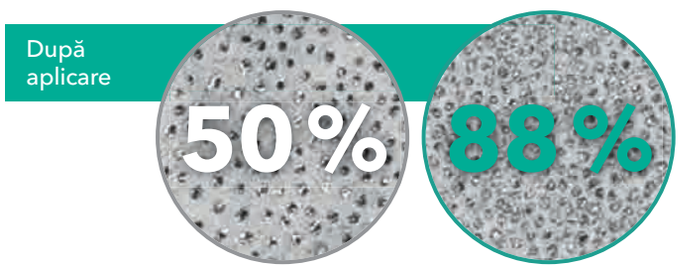
Tehnologia PRO-ARGIN



Studiul 2[2,*]

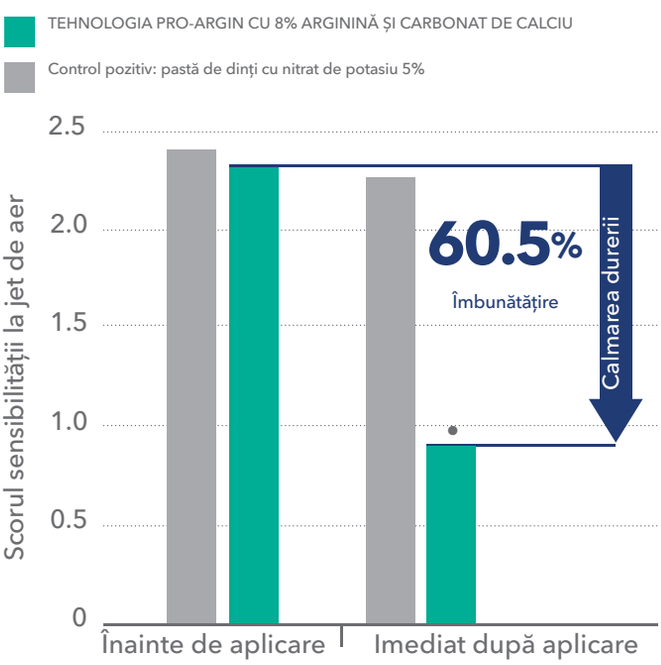
Tehnologia Novamin/ fluorură de sodiu

Tehnologia PRO-ARGIN



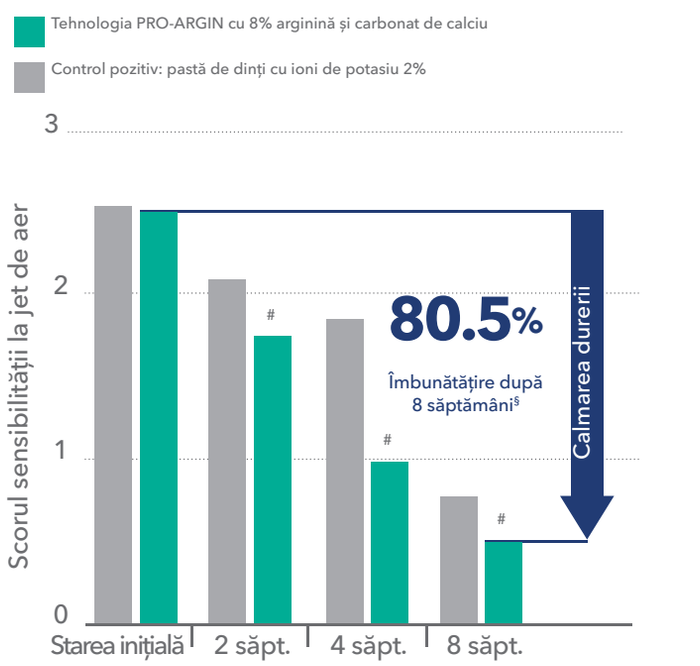
elmex® SENSITIVE PROFESSIONAL oferă calmare semnificativă imediată** și de durată a durerii din sensibilitatea dentară[3,4]

Calmarea semnificativă a durerii din sensibilitatea dentară instant[3,‡,**]



‡ În comparație cu starea inițială (sunt prezentate doar datele relevante)
• Semnificativ statistic (p<0,001)

Calmarea semnificativă de lungă durată a durerii din sensibilitatea dentară după 2, 4, și 8 săptămâni de utilizare[4,§,&]



§ În comparație cu starea inițială
& În comparație cu o pastă de dinți comercială desensibilizantă, ce conține 2% ioni de potasiu și 1450 ppm de fluor (NaF)
# Semnificativ statistic (p<0,05)

*Studiu in vitro, imagini reale de microscopie confocală după 5 aplicări (p<0,05%);
**Pentru calmarea imediată aplicați direct pe suprafața sensibilă și masați ușor cu vârful degetului timp de 1 minut.

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Characteristics of titanium-based materials used in implant dentistry

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Abstract

Titanium and titanium-based alloys are the materials of choice for the dental implants, proving excellent biocompatibility and corrosion resistance. Surface modifications are currently performed, primarily to promote better osseointegration. As a result, many approaches have been carried out to improve the quality of existing dental implants, and to accomplish the biological requirements. The present paper aims to review the main characteristics of titanium-based materials and their advances in implant dentistry.

Keywords: Titanium, Dental Implants, Dental Alloys.

INTRODUCTION

During the Second World War, titanium applications in medicine were aimed for surgical and dental devices. Nowadays, pure titanium and its alloys are widely used to make orthopaedic and dental implants due to physical properties, such as corrosion resistance and high modulus resistance, elasticity in tension and excellent biocompatibility [1]. In dental field, titanium is used as dental implants, as frameworks in prosthodontics, as plates in maxillofacial surgery, as instruments in endodontics and as wires and mini-implants in orthodontics. Dental implants are used as artificial tooth roots since more than five decades, to fix and support prosthetic suprastructures, from single crowns to fixed and removable prostheses. The indication ranges from single tooth gaps up to edentulism. Remarkably, since the pioneering work of Brånemark, Zarb, Albrektsson, Schulte, Schroeder and others in the field of osseointegration [2-7], the material of choice is still titanium or titanium alloys, even though recent alternative materials have gained increasing interest, such as zirconia.

The present paper aims to review the main characteristics of titanium-based materials currently used, and their advances in implant dentistry.

1. PHYSICAL AND CHEMICAL PROPERTIES

Titanium is a metallic element, a transition metal, which is found in the periodic table of elements, represented by the atomic symbol of "Ti", with an atomic number of 22 (22 protons and 22 electrons) and with an atomic weight of 47.87 u. Titanium is characterized by a lustrous metallic white colour, high strength, low density and a melting point of 1672ºC [8]. It exhibits high electrical conductivity and low thermal conductivity. When titanium is exposed to air, it forms a layer of titanium dioxide (TiO2) which protects the surface against dissolution (corrosion processes) [9].

Titanium is used as commercially pure titanium (CP Ti) and in titanium-based alloys. CP Ti can be found in four grades (1 - 4), with main differences in chemical and mechanical behaviour. These four types present different physico-chemical properties, grade 1 being the softest, while 4 is the toughest [10]. CP Ti is used in oral implantology due to the superior properties that it offers, such as osseointegration, lower modulus of elasticity and very good corrosion resistance. Titanium alloys exist in the form of alpha, beta and α-β, depending on the predominant phases within the alloy. Ti-6Al-4V is most used in the field of medical applications and it represents the alloyed form of titanium, and it is preferred when stress tolerance is required. The alloying elements (aluminium, vanadium, zirconium, tantalum etc.) are used to improve the implant's mechanical properties in order to obtain a better behaviour in terms of resistance, strength and formability [10, 11].

Corrosion and resistance to corrosion. Corrosion is defined as a chemical and electrochemical reaction that leads to the progressive destruction of a material in its environment, leading to the loss and release of metallic ions from the surface. Several types of corrosion processes have been described: uniform, crevices, galvanic, intragranular or electrochemical corrosion [12]. The release of different types of metallic ions in the oral cavity can lead to biocompatibility issues due to cytotoxicity and allergic reactions, with local or general manifestations. Corrosion is induced by interactions between the implant material and the chemical compounds with an electrochemical process [13]. The corrosion resistance has to withstand the oral environment which can suffer pH and temperature variations, mechanical loading forces during mastication and food and drugs contact [14]. The passive oxide layer that forms on the biomaterial surface, at the bone-implant interface, is responsible for the electrochemical stability. The corrosion behavior of titanium alloys depends on the oxide film mainly composed of TiO2, so-called 'passive layer' which spontaneously covers the titanium surface and its alloys, storing phosphorus and calcium ions from the bone matrix [15, 16].

2. BIOCOMPATIBILITY

The definition of biocompatibility has changed over time, following the evolution of techniques and methods in the biomaterial industry. In the past, a material had to have the ability to behave specifically, with an appropriate response from the host, while a much more modern approach emphasises that, beside the functions, it performs a suitable cellular or tissue response in that specific situation is needed [17, 18].

In implant dentistry, biocompatibility and surface roughness are considered important for obtaining good tissue interaction and promoting osseointegration [19]. After implant placement, various biological effects occur, being influenced by surface roughness, and allowing osseointegration within different time periods [20].

Blood is often the first body fluid encountered by implants. Blood-material interactions trigger a cascade of events including protein adsorption, platelet adhesion and activation, coagulation, and thrombosis [21]. Therefore, issues concerning biocompatibility first address these events related to interaction with biomaterial surface. Several varieties of tests are currently used to establish that new materials are biologically suitable. These tests are classified as in vitro, in vivo (animal) and usage tests [22]. In vitro tests for biocompatibility are performed by placement of a material or a constituent of a material either in contact with a cell, or different isolated biological components [22]. The contact can be either direct, when the contact material - cell system is without barriers, or indirect, when there is a barrier between the material and the cell system [22]. In vivo testing for biocompatibility involves mammals such as mice, rats, hamsters, guinea pigs, and they are different from usage tests in that the primary aim of material testing is to understand complex systemic interactions and mechanisms, irrespective of material's final use [22]. Thus, the biological responses in animal tests are more exhaustive and often more relevant than in vitro tests [22]. Various tests are currently used to investigate new materials, such as screening for genotoxicity, carcinogenicity, cytotoxicity, irritation, sensitivity, etc [23, 24]. Usage tests can be performed in animals or in humans [22]. They are considered gold standard because the material to be tested is placed in a situation identical to its future planned clinical use [22]. The fidelity of parameters mimicking the clinical use of material impacts the accuracy of biocompatibility assessment [22]. However, these tests are the most expensive, long lasting and involve many ethical issues.

Titanium and its alloys are well known as materials that are not only well tolerated by living tissues, but also able to promote osseointegration, being a key factor for successful dental implantation. Most of the titanium alloys used in medicine are CP Ti and the Ti–6Al–4V alloy [25]. However, the presence of Al and V in the alloys may promote toxicity after long-term implantation [26]. Therefore, development of new alloys without these two elements, and containing nontoxic elements, such as Nb, Ta, Mo, and Zr, is extensively investigated [25, 26].

Another important aspect proved to be of utmost important for research in biomaterials field concerns porous titanium and its alloys. Titanium-based materials with porosity are beneficial not only for adhesion and viability, but also for cell differentiation and growth, and most important for bone formation [27]. Many studies have been conducted on porous coatings and completely porous scaffolds [28-30]. With this respect, high porosity and large pores of scaffolds enhance bone ingrowth and osseointegration of the implant after surgery [30].

3. SURFACE PROPERTIES AND SURFACE MODIFICATIONS

The quality of the dental implant depends on the surface properties [19]. Modifications of the implant surface have been mainly performed to improve osseointegration.

Surface roughness. One of the most important surface features is roughness. Surface morphology plays a crucial role in osseointegration of the implant by stimulating osteoblasts and collagen secretion. Surface roughness plays an important role in implants

osseointegration, a rougher surface favouring osteoblasts attachment, whereas epithelial cells and fibroblasts attachment is facilitated by a smoother surface [31].

Surface tension and surface energy. Surface tension usually defines liquid surfaces, while surface energy defines solid surfaces. Surface tension is related to surface topography and chemistry, being an important parameter. Surface energy is determined by the "contact angle" (CA) measurement of a fluid droplet on the solid. The CA is measured from the tangent to the droplet surface at the point of contact, through the droplet to the solid surface [32]. Surface topography, surface charge and chemical composition can influence the surface energy. Surface energy affects the adsorption of proteins [33].

Changes in the surface roughness can raise the implant's surface, enhancing tissue response and cell attachment. Surface modification increases osseosintegration by stimulating cell adhesion, migration, and proliferation processes [31]. From the point of view of the biological response, titanium and titanium alloys are bioinert materials, but surface treatments can make them bioactive [34].

Surface treatments methods can be chemical, physical or physical. Surface modification can be achieved through different methods: subtractive methods (acid etching, grit blasting or combinations), additive methods (plasma spraying, pulsed laser deposition, electrostatic spray deposition, sol-gel deposition) or additive/subtractive methods (anodization) [15].

Several materials have been used as coatings over dental implants made out of a core of titanium, such as: carbon [35], bisphosphonates [36], bioactive glass [37], hydroxyapatite [38, 39], nitrided titanium [40].

CONCLUSIONS

Titanium and titanium-based alloys are extensively used in implant dentistry. Researches and developments in this field have led to improved characteristics of these materials as related to biocompatibility, which is the most important issue to be considered for successful results.

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Selective stripping enameloplasty in bilateral second upper incisor anodontia – a case report

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Abstract

In the case of a 14-year-old male with a diagnosis of bilateral second upper incisor anodontia, orthodontic treatment aimed at correcting the canine root axes as well as the orthodontic closure of the spaces through grouping of canines, premolars and molars. Coronary remodeling was performed by "in minus" enameloplasty (grinding) of canines. This consisted mainly of turning the tip of the canine cusp into incisal edge as well as adjusting the palatal sides slopes in order not to create interference during propulsion and lateral masticatory movements.

Keywords: interdisciplinary treatment, enameloplasty, bilateral anodontia, upper lateral incisors

INTRODUCTION

As we stated in a previous article [1] anodontia (agenesy, aplasia) is defined as the absence of one tooth or several teeth in dental arch without extraction. Some authors considered it as a phylogenetic teeth reduction. This type of anomaly was found in the same family members, so it was concluded that anodontia has a hereditary genetic characteristic.

As frequency this anomaly has slightly variations among authors (for Romanian population): 2.2% - Boboc [2], 3.53% - Ionescu [3] or 9.6% - Mecher (quoted by Ionescu) [4]. The symmetrical type is with or without the persistence of the temporary correspondent; with totally or partially enclosed space.

In the treatment of these anomalies, which sometimes requires a long period of time, interdisciplinary collaboration can be manifested by the interweaving of purely orthodontic means (for example, directing the eruption of permanent teeth) with conservative restorative prosthetic, surgical or odontal/restorative solutions (within the last mentioned – enameloplasty).

CASE REPORT

I. Anamnesis and clinical examination data

The patient C.C., 14 years old, male, at the clinical examination presented a mixed dentition with a dental age deferred to minus 2 years (presence of 7.5 and 8.5 over the replacement period), absence of 1.2 and 2.2 and spaces between upper and lower canines, bilaterally distalised molar reports. The anamnestic investigation excluded the existence of a traumatic episode, the patient confirming that his mother has the same pathology.

II. Paraclinical investigations

On the orthopantomography, it was observed that the space of the superior canines in relation to the central incisors was due to the absence of lateral incisor buds (Figure 1, arrows).

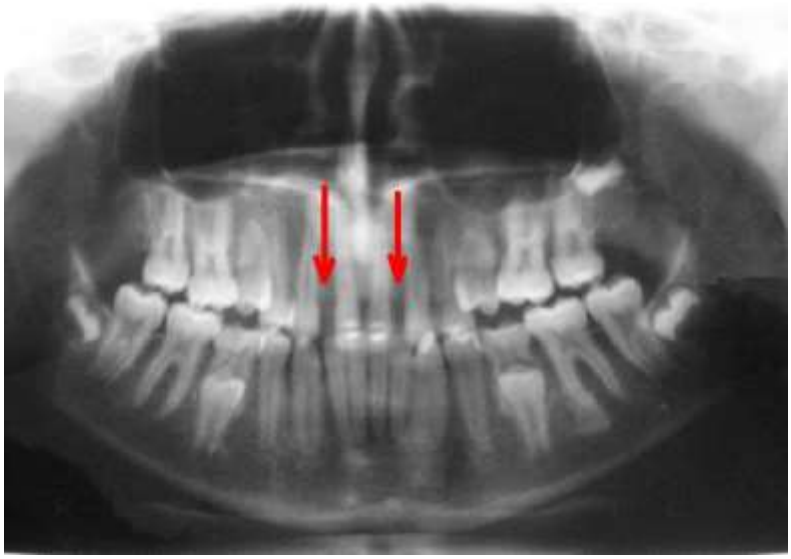

Figure 1. Patient CC, 14 years old, male, initial orthopantomography, with bilateral upper lateral incisor anodontia (personal case)

III. Diagnosis

The diagnosis was: Angle Class II anomaly, division 1, narrowed upper arch with prodentia, bilateral anodontia of upper lateral incisors of hereditary etiology, with persistence

of 7.5 and 8.5 over the permutation age, with impairment of esthetic, masticatory and self-sustainability functions.

IV. Treatment and evolution

This case is one in which the space of the upper lateral incisors was closed by the bodily migration of 1.3 and 2.3, the orthodontic treatment aiming to correct the canines' root axes, as well as the orthodontic closure of the spaces by grouping the canines, premolars and molars (Figure 2).

Figure 2. Case of patient C.C., 14 years old, male, with orthodontic closure of the spaces by grouping canines, premolars and molars (personal case)

Considering a less laborious and demanding intervention, we proceeded to coronary remodeling/enameloplasty through grinding the canines' enamel *during* orthodontic treatment (between the space closure phase and the occlusal reports finishing phase). This consisted mainly of turning the tip of the canine cusp into an incisal edge, as well as adjusting the slopes of the palatal surface, in order do not create interference during propulsion movement. A great advantage was that the anterior guidance group was made on the upper central incisors [5-7].

The proposed objectives for adapting the canines' aspect to their new role were materialized by marking the points of interest with articulation paper, incisal preparation with fine diamond burs, followed by polishing with resin gums and fluoridation [8].

DISCUSSIONS

The present situation was good for substitution of the canine, because of class II Angle molar relationship, with a good alignment of the lower teeth and an acceptable profile, therefore minimal conditions for a stable outcome.

A problem we faced with was the length of the superior canines. Since the normal length of the lateral incisors is smaller than the central incisors, the placement of the canine gingival margins has been aimed to be more incisal than the central incisors. Hence the superior canines were stimulated to continue their eruption. In the same time we aimed to ensure a minimal overbite at this level, necessary to maintain the results.

Although the color of canine crowns is usually darker than the front group color, it was not an impediment for this patient, due to his male gender affiliation, and slightly negligence to frontal chromatic harmony [9, 10].

A difficult aspect of canine transformation into a lateral incisor was given by the emphasized contour of the buccal face of this tooth. Although in this case the upper canines were more payable in this area, the vestibular surfaces remained more convex or rounded than those of the lateral incisors, and it was a real challenge for us to turn these teeth into laterals. Typically, placing a veneer on the buccal face [11] would result in an agreeable esthetic result, but in the present case the patient did not want it, being satisfied only with the flattening of the canine cusp tip until reaching an approximate incisal edge shape.

Even if we wanted a more thorough crown transformation, the patient's clinical appearance, still under orthodontic treatment, two years after restorative interventions (Figure 3), is satisfactory [12, 13]. But the presence of a chronic gingivitis in the lower arcade (due to inappropriate oral hygiene) was still a factor of our dissatisfaction.

Figure 3. Patient C.C., 14 years old, male, two years after crown remodeling of superior canines by enamel preparations at incisal level (personal case)

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Comparing Bio C and ApaCare as preventive measures for patients wearing fixed orthodontic appliances

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Abstract

Wearing fixed orthodontic appliances makes cleaning and keeping proper oral hygiene more complex. Food is getting caught between the brackets and resists brushing. Thus, the mouth flora changes by the development of a soft pellicle, which transform into tartar if the soft deposits are not removed. By metabolizing carbohydrates, the pH drops, generating an imbalance in the oral cavity. Relating to this fact, the following study focuses on the achievement of favorable oral hygiene and gingival health despite a fixed orthodontic appliance.

Two different materials were used and evaluated. The selection of the used products was based on the different substances and their effects. One, named Bio C, is decreasing the microbes and bacteria by the chemical defense and the other one, called ApaCare, is effective due to mechanical reduction through increased tooth surface smoothness. Acting in dissimilar ways, they are tested to treat and prevent further plaque accumulation and subsequent gingival inflammation at patients with fixed orthodontic appliances.

Keywords: preventive measures, orthodontic appliances, varnishes, ApaCare, Bio C.

INTRODUCTION

In recent days, appearance has become an important aspect of every day's social interactions. Young people have role models which dictate their public appearances and their lifestyle. One of the most important aspects of beauty is the smile. A healthy perfect smile opens doors to society, influences social interactions, job interviews and raises self-esteem. It can implement in different ways the financial status of the family in our society and thereby it is important to straighten teeth already in young years. Orthodontic treatments require meticulous oral hygiene as a baseline in order to achieve a healthy smile.

The multiband appliance facilitates food retention and aggravates the cleaning ability of the teeth. Caries actually develops through the dissolution of hydroxyapatite due to the process of bacterial fermentation in the present biofilm or plaque. A triggering factor is crowding. Other predilection sites for soft debris and plaque accumulation are related to the dental anatomy: occlusal deep fissures/pits (converging), gingival margins, interproximal spaces, especially in spacing and tooth restorations [1].

Dental plaque is primarily removed mechanically by tooth brushing. Another approach is using antibacterial substances to improve and regain the healthy oral flora and the buffer capacity of the saliva. The main objective is to diminish bacteria colonies which are facilitated by the active ingredients contained in mouthwashes and toothpaste, the intensive brushing acting directly against the oral microflora or sequelae of their metabolism [2].

The products biocompatibility or risk of the harmful effect depends on their concentration released in the environment and the main active substance itself. Within a biofilm, bacteria have a slower growth rate and thus the polymer synthesis grows, which favours plaque accumulation [3,4].

The prevention and control are done mainly by mechanical removal achieved by tooth brushing and flossing. Furthermore, secondary plaque control is achieved by chemical stimulants like chlorhexidine and antibacterial substances [5, 6].

Dental varnishes have different roles in the medical use and application. The main properties of film-forming polymers are the maintenance of adhesion, keeping the tooth surface hydrated in a thin unique layer [7].

Other attributes of dental varnishes are building physical barriers and release of active substances. Thereby they aim to protect the teeth from caries by releasing fluoride or antimicrobial substances, desensitize sensitive tooth necks, closing dentin tubules with the creation of a mechanic block, and enhancing the tooth shade aesthetics with bleaching agents.

Antimicrobial varnish is used to control and reduce the acidic outcome produced by the fermentation of soft deposits and plaque on the tooth surface. As a result, the bacterial balance shifts to a healthier level by inhibiting microbial growth. As a second positive effect, the demineralization reduces. Additionally, it minimizes the inflammation of gingival tissue caused by bacteria.

The main target of fluoride varnishes is to prevent the tooth surface to develop carious cavities by helping to remineralize the enamel and dentin with fluoride and prevent the surface from erosion. It is utilized as a decreasing sensation on exposed cervical dentine, as a primary preventive measure, as cavity liner and in patients with high to moderate caries risk. They exist with low fluoride concentration for long exposure and high fluoride concentration for a shorter exposure [8,9].

Aim

This study was performed to investigate if there is a difference in the preventive measure for oral hygiene in correlation with gingival inflammation using two different materials acting in two different ways, chemical and mechanical. The Bio C, clorhexidine varnish actus upon the gingiva in a chemical and antimicrobial way, whereas Apa Care acts

in a mechanical way, sealing the tooth surface with hydroxyapatites and thereby reducing the rough surface and the opportunity for the bacteria to attach easily.

MATERIALS AND METHODS

The target population is randomly selected from a private orthodontic office between the months of April and Sepetember 2018 and serve as the material of the study. A total number of 24 patients with fixed orthodontic appliances presenting gingival inflammation have been examined and registered for the study. Out of the total number, six patients were excluded, due to disrespecting scheduled interval appointments.

The first step of the clinical study was to inform the patients wearing fixed orthodontic appliances about the ongoing procedure and obtaining patient consent. Procedures performed were: consultation, staining with toluidine blue, ultrasonic scaling, brushing with a slow speed handpiece in order to remove staining.

Two materials were used: Bio C (Biodent, Netherlands) a 20%-Chlorhexidine varnish and ApaCare (Cumdente GmbH) a 20% hydroxyapatites (liquid enamel) that makes the tooth surface smoother.

For each material 10 patients with inflamed gingiva and fixed orthodontic appliance were included in the survey. After staining the plaque with Mira-2-tone dye for good visibility the Silness-Löe Plaque Index plaque and Silness-Löe Gingival Index were registered.

After a professional cleaning for one group randomly applied the Bio C varnish and the other received the ApaCare Varnish.

After three to four weeks, the reappointment took place. The same tests were performed as in the first appointment to compare whether or gingival health and plaque accumulation is improved by measuring the gingival and plaque index.

Therefore, a comparison is made between a mechanical and biological action of these two different materials, trying to find the most effective one in improving the oral health in only one application appointment.

RESULTS

The 20 patients included in the study had the average age of 13,9 years and the mean of wearing the fixed orthodontic appliance was 18.2 weeks, annualized around four and a half months.

Under mentioned diagram (Figure 1) the comparison of the indexes for the initial plaque index and the final plaque index for all ten patients received Bio C point out not having big differences, three out of ten have bigger plaque accumulation on the dental surface than on the first visit.

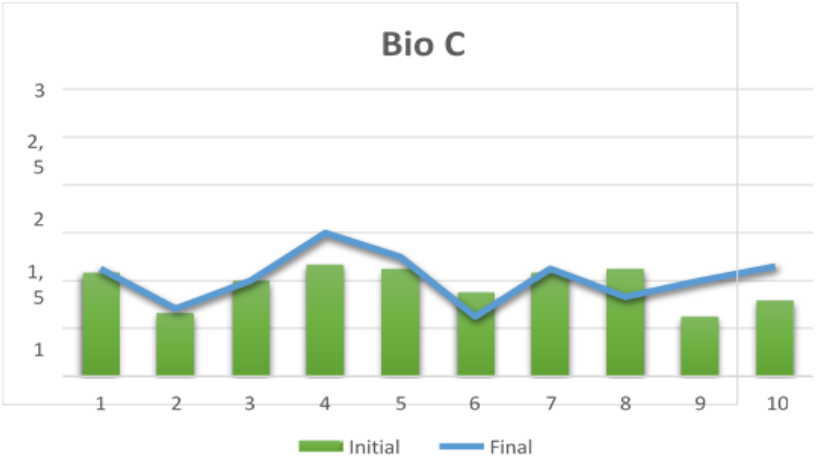

Figure 1. Initial and final plaque index for patients received BioC

Figure 2 shows the comparison of the indexes for the initial and final gingival index for all ten patients received Bio C out of this sample, three showed improved values and four downgraded with the index particularly. The other rest did not change expulsive and stayed the same.

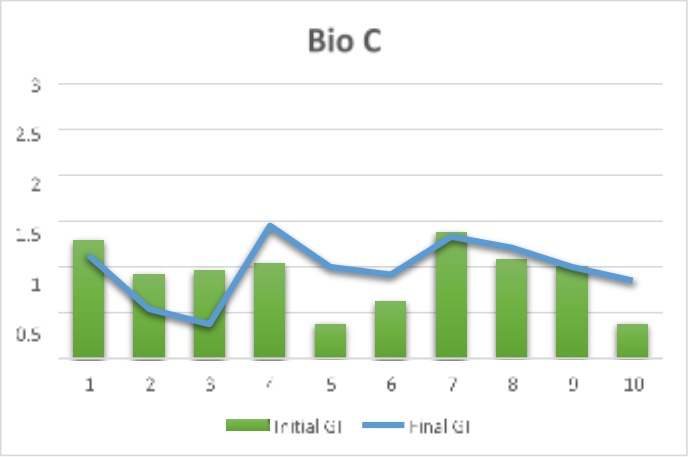

Figure 2. Initial and final gingival index for patients received Bio C

At the next diagram, a comparison of the final plaque index and gingival index, after the application of Bio C measured at the recall time for every patient, is illustrated (figure 3), the two indexes are a correlation to each other, except for patient three, where there is a big improvement in the gingival index compared to the plaque index, having a mean of 1,03 for the final plaque index and 0,97 for the final gingival index.

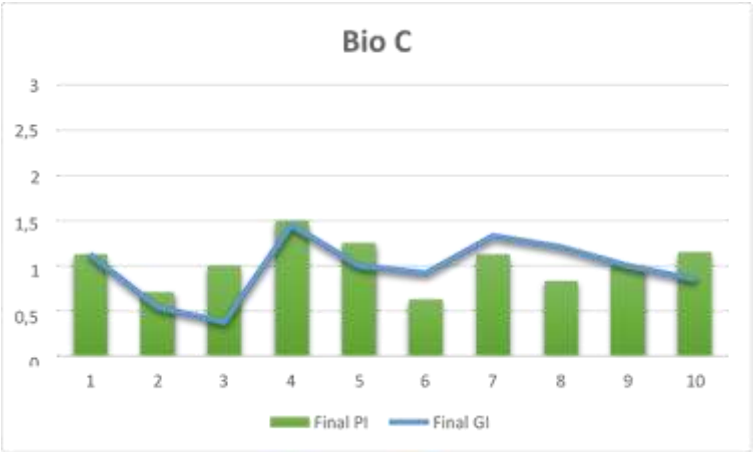

Figure 3. Final plaque index and gingival index for patients received BioC

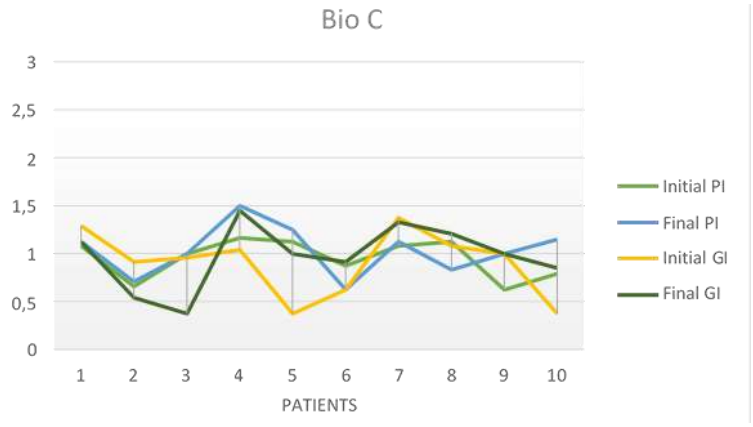

Figure 4. Overview of collected data for 10 patients received BioC

Figure 4 is illustrating all indexes, final and initial plaque and gingival indexes, in one diagram, to make the comparison of them in one time. It shows that there is no big difference in the indexes, meaning in the gingival health and plaque accumulation on tooth surfaces. It stays around the index one for all four measured indexes at the initial measurement and after the application of Bio C. This signifies the gingiva is mildly inflamed with slight edema and colour change, but no bleeding at probing. The plaque accumulates around the free gingival margin and the areas around (brackets). The soft deposit is mainly seen only by probing or coloration.

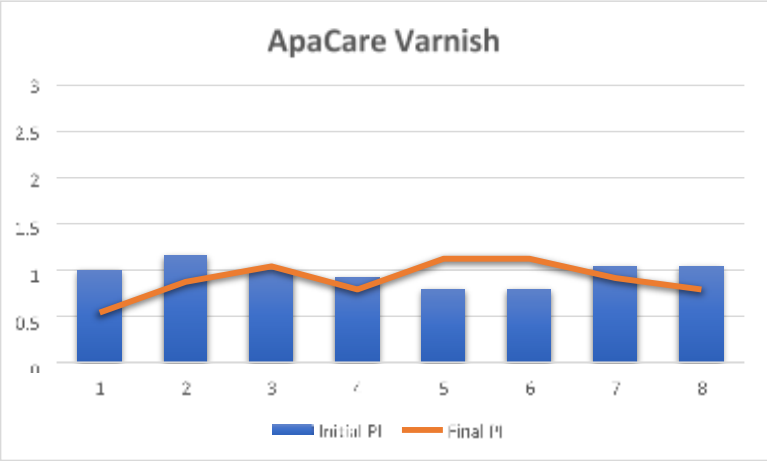

Figure 5. Initial and final plaque index of patients received ApaCare

The line drawing of figure 5 shows the comparison of the initial and final plaque index after the application of ApaCare varnish on the tooth surface after a professional tooth cleaning on eight patients. As it can be read out of the diagram, there is no big difference in the plaque accumulation in the different patients. It stays comparatively similar, except patient one having an improvement of around 0,5 and patient five and six declined around 0,4. In total they had an initial plaque index mean of 0,967 and the final plaque index mean of 0,9.

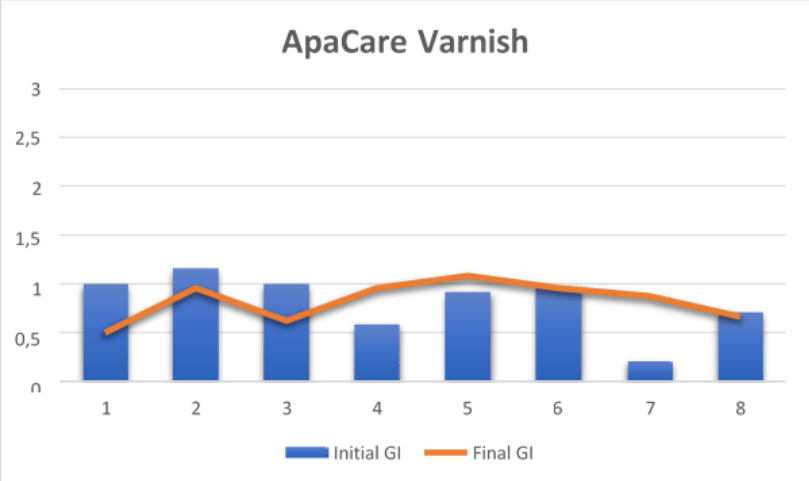

Figure 6. Initial and final gingival index of patients received ApaCare

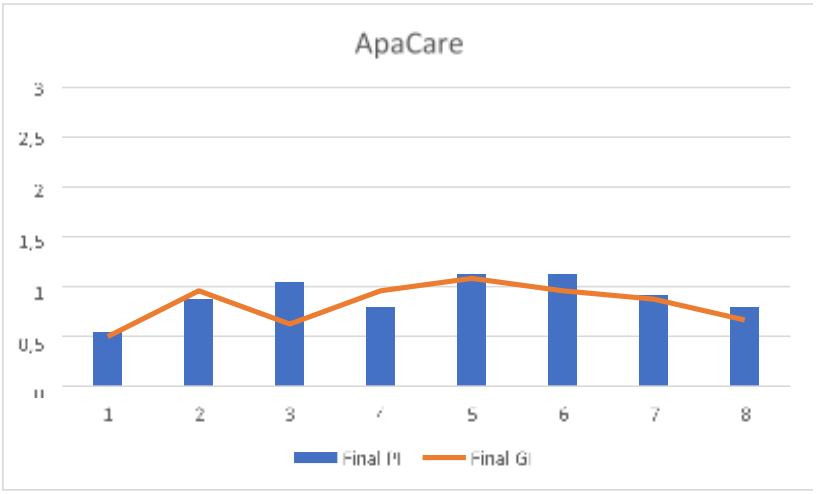

Figure 7. Final values for plaque and gingival index at the patients received ApaCare

The values of initial and final gingival index after the application of the ApaCare varnish (figure 6) are not changing that much, except in the patient one, improving the value and in the patient seven, worsening, having an initial mean of gingival index of 0,816 and a final mean of 0,827.

Figure 7 is illustrating a slight improvement of final gingival index compared to final plaque index, except in the patient two and four; the mean final plaque index is standing around 0,90 and the mean final gingival index is around 0,83.

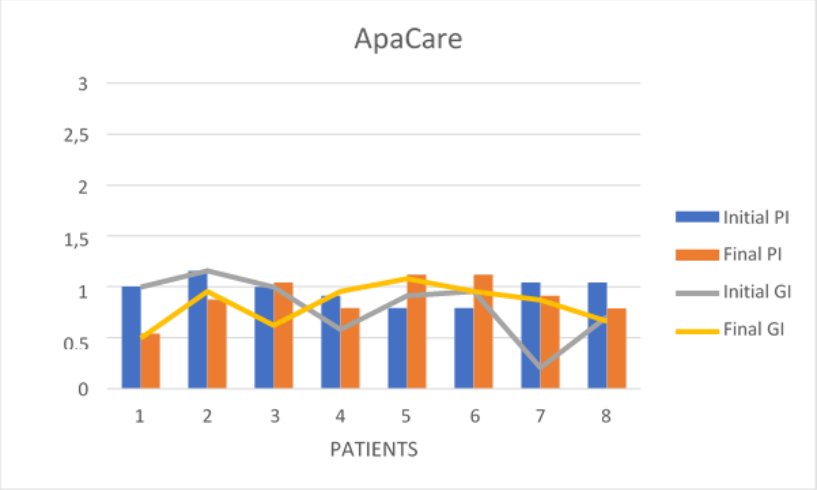

Figure 8. All oral hygiene indexes for the patients received the ApaCare varnish

The value were staying around the same indexes, showing a correlation of the plaque deposit and the gingival health, indicating that plaque can initiate gingivitis (figure 8).

DISCUSSIONS

The purpose of this study was to compare the preventive measures and achievement of the two different acting varnishes, Bio C and ApaCare, with different active components chlorhexidine and hydroxyapatites. Evaluation is based on the gingival inflammation index and plaque index of patients with a fixed orthodontic appliance. Gingival inflammation in orthodontic appliances represents a reaction to poor plaque control due to the increased plaque retention areas around the multibrackets.

To aim good oral hygiene, it seems logical to perform chemical biofilm management in the terms of adhesion-inhibiting, bacteria-growth-inhibiting ingredients of gels, varnishes,

toothpaste or mouthwashes, in order to decrease caries and gingival inflammation. Another possible starting point is influencing the metabolism of oral bacteria.

Wang et al. found that a comprehensive oral hygiene care program helped patients to control plaque, decrease gingival inflammation and improve patient oral health status.

In this study, gender differences were not compared as the number of female patient was a quarter out of the total of male patients. In addition, other studies found that there were statistically not significant in oral hygiene practices between genders or age groups [10].Among other studies the caries prevalence in young aged group (17-25 years) is higher, meaning that oral care prevention is quite important, especially considering it as the cornerstone of lifelong healthy dentition [11].

A study by Sehgal A. et al. compared the efficacy of chlorhexidine varnish in orthodontic patients, which showed only a significant reduction of gingival and plaque indexes over a period of 6 months when compared to a control group [12].

Bio C already exists for a long time on the market and a lot of studies were done and proved the positive effect of the material. Among all the research, the wider used chemical product of these two materials is BioC due to its widely known composition, effectiveness and research.

Apa Care promises the reparation of erosion and white spot lesion, simultaneously complicate bacterial plaque accumulation through the Nanohydroxyapatites. As proven in the previous studies nanohydroxyapatites are claimed to control the biofilm by promoting small enamel lesion remineralization, whereby the tooth surface becomes easy to clean and wear- resistant [13,14].

A study investigating the evolving application of biomimetic nanostructured hydroxyapatite from Roveri N. was proven that nano and micro hydroxyapatites particles were coating the tooth surface resulting in smooth surface and opposed plaque formation, aspects documented also by electron microscopic scanned images of enamel surface after the application of biomimetic carbonate-hydroxyapatite nanocrystals [15,16].

Another study by Kentsche et al., in which nine subjects participated, the influence of pure hydroxyapatite clusters on initial biological adhesion and bacterial colonization on the tooth surface was investigated [17]. Distilled water with hydroxyapatite (5 grams per 100 ml) was the test solution., as the used positive control was 0.2 percent CHX solution and no rinse solution was used as the negative control.

The study shows that the hydroxyapatite clusters are not permanently established on the enamel surface but are desorbed quickly.

To gain more distinct results, longer study time with increased repeated application and controlling of the materials would be necessary to improve the outcome. An alternative may be to measure these indexes before the application of braces, during and after in order to see changes in gingiva and the resulting effect of fixed orthodontic appliances. This extra prophylactic educational lesson may facilitate also the patient to improve his one oral hygiene.

CONCLUSIONS

It is important to educate children that meticulous oral hygiene is the best thing you can do for healthy teeth. In orthodontics it is even more mandatory to keep proper oral hygiene, using preventive strategies as oral health promotion, patient education, professional oral hygiene and regular visits at the dentist. Chemical plaque control and fluoride in combined use for efficient caries control in orthodontic patients are supportively recommended.

Comparing the effectiveness of the two varnishes Bio C and ApaCare, there is no significant difference in improved oral hygiene of the study population. The investigated study population is not sufficient in quantity and prolonged follow-up interval are necessary.

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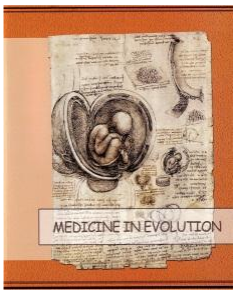

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Dental Hygienist

Full title: European Training Platform for Continuing Professional Development of Dental Hygienist
Start: 2015/09/01
Finish: 2018/08/31
Programme: ERASMUS+
Sub-Programme: Key Action – Strategic Partnership
Coordinator: Karolinska Institutet

Oral health is a determinant factor for quality of life, essential for well-being, and an integral part of general health.

Our mission is to promote oral health and the cost effective prevention of oral diseases in Europe. In the EU, the socio-economic burden of oral diseases is considerable: they affect the majority of school-aged children and adults and account for 5% of public health spending". The European Platform for Better Oral Health.

The dental hygienist is the key provider of preventive oral care in order to promote and improve the oral health of individuals, families and groups in society. The European inequality in access to oral health care can be tackled by harmonisation of dental hygienist education on ground level and increasing access to continuing education.

The goals of EuHyDens are:

- ✔ Demonstrate the importance and role of dental hygienists in the society by improving skills and knowledge.
- ✔ Harmonization of dental hygienists qualifications in Europe.
- ✔ Recognition of the dental hygienist profession in all EU-member states.
- ✔ Mobility of dental hygienists and cross-border cooperation among stakeholders
- ✔ Strengthen the position of dental hygienists by encouraging entrepreneurship activities and by promoting communication and mobility among the dental hygienists within the EU-nations.

KAROLINSKA INSTITUTET, Sweden

Institute of Entrepreneurship Development, Greece

UNIVERSITATEA DE MEDICINA SI FARMACE VICTOR BABES TIMISOARA, Romania

UNIVERSIDADE DE LISBOA, Portugal

European Dental Hygienists Federation, Spain w

SC AFRA SRL, Romania

Praktikertjänst AB, Sweden

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