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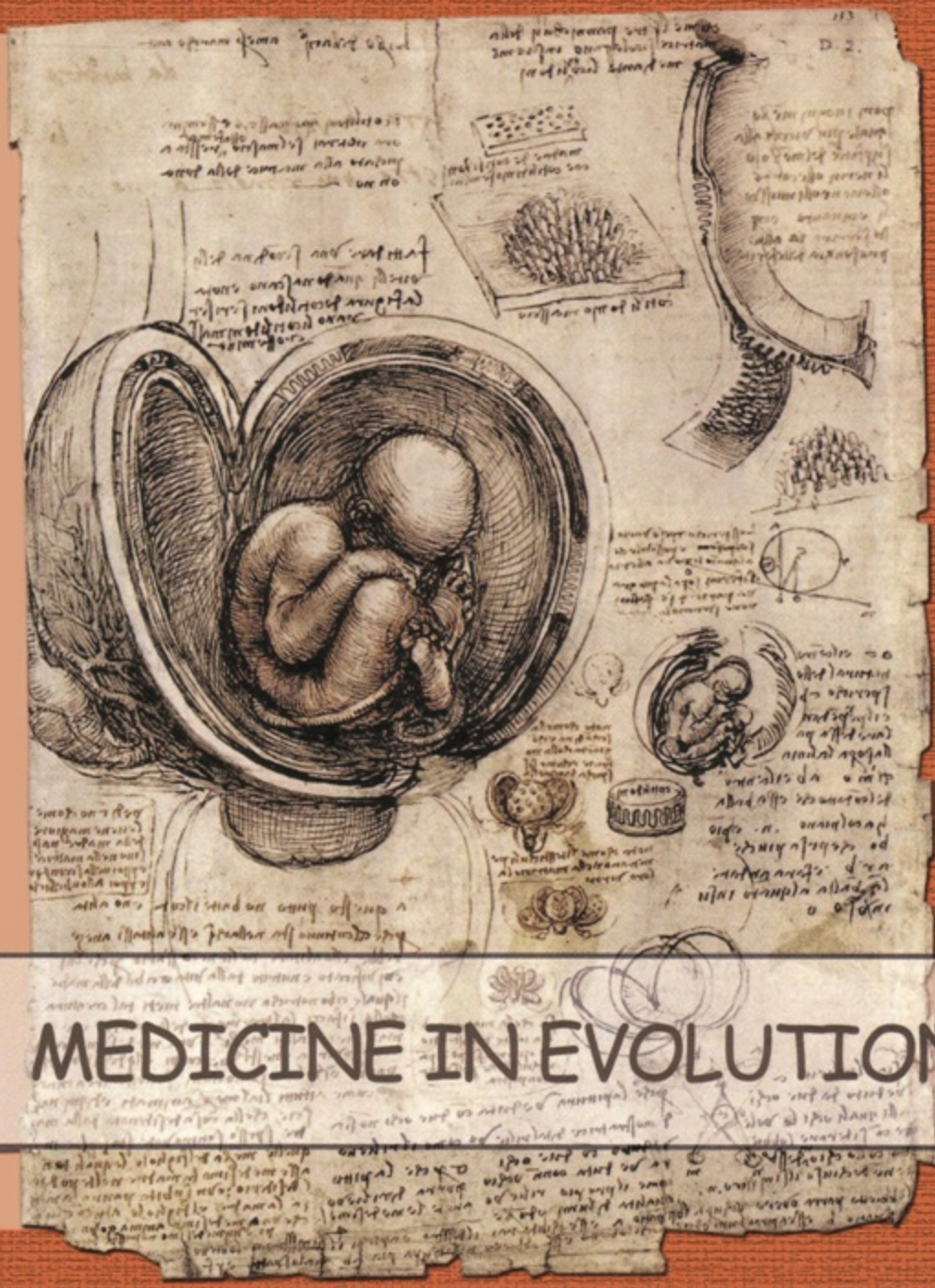

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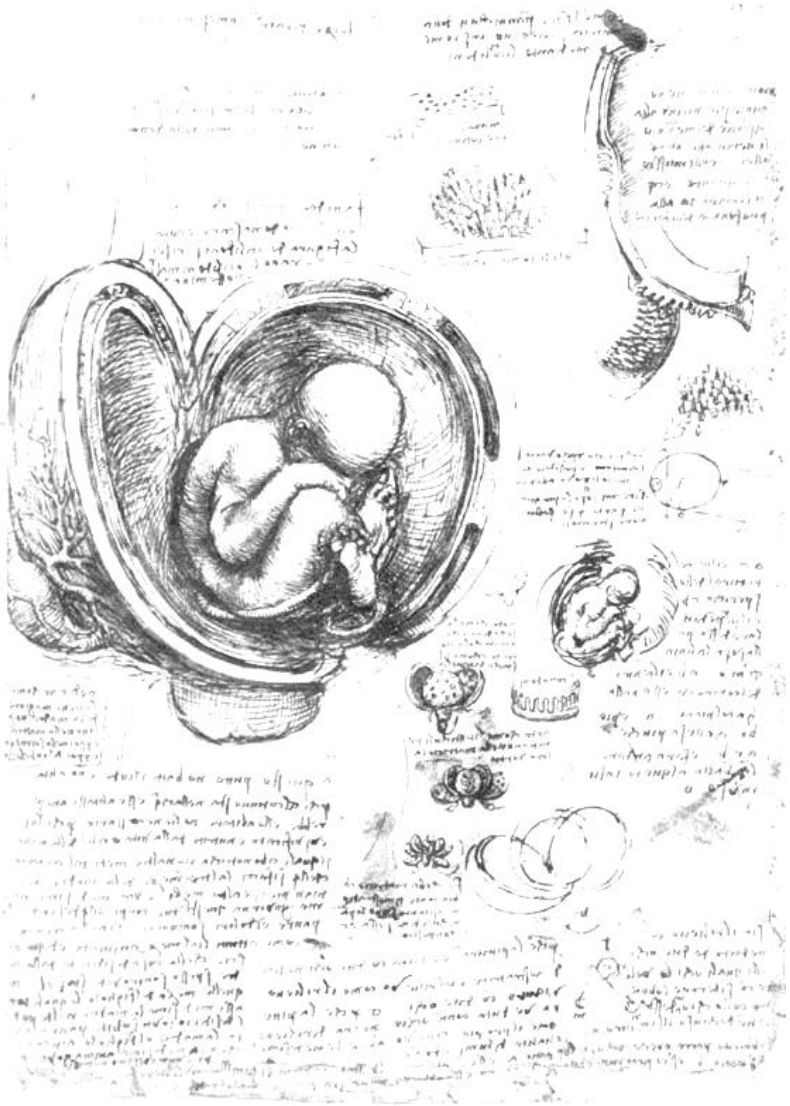

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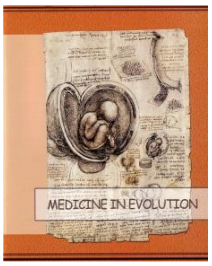

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ABSTRACT

We have analysed the approach in the Romanian legislation and in the medical malpractice doctrine from the adoption of the Law on health care reform in 2006, as subsequently amended, and the correlation of the terms used in the legal definition with other dedicated institutions of the Romanian civil and criminal law.

The definition of medical malpractice which is affected by ambiguity is likely to maintain an uncertain regulation in which parallel and inefficient administrative and professional jurisdictions operate in terms of patient compensation, the patient being forced almost exclusively to go to the court to obtain effective redress.

Despite numerous changes in the law, we find the same terminological and conceptual inconsistencies and we make suggestions de lege ferenda to remedy them.

Key words: *medical malpractice, civil tort liability, Law on healthcare reform*

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DEFINITION OF MEDICAL MALPRACTICE IN LAW AND DOCTRINE

Medical malpractice in Romania is defined in Law no. 95/2006 on healthcare reform in Article 642 paragraph 1 letter b) as "professional error committed in the exercise of medical or medical- pharmaceutical act that generates prejudices to the patient, involving civil liability of the medical personnel and of the provider of medical, healthcare and pharmaceutical products and services."

As already noticed in the specialty literature, the existence of professional misconduct, as basic concept, makes the notion of malpractice equivalent to the notion of fault. The observation is correct, since the idea of professional misconduct, whether actually committed or by omission, forms the basis of the malpractice concept.

However, the use of the concept of professional error in the definition given by the legislator remains unfortunate, because the concept of error has completely different legal connotations, being used with a traditional dedicated legal sense in both civil law and criminal law.

Thus, the New Civil Code speaks of the common and invincible error (Article 17), the error of consent obtained by misrepresentation (Article 1207 and the following), while the Criminal Code operates with the notion of error of fact (Article 51). The legal meanings of the use of the word "error" in the New Civil Code and in the Criminal Code are consistent with its semantic value conferred by the Romanian Explanatory Dictionary (DEX), unlike the use of the word in the legal definition of medical malpractice.

According to the dictionary (DEX), error means "a knowledge, idea, opinion, erroneous opinion; a false representation of a factual situation or of the existence of a legislative act."

Feeling probably confused by his own definition, the healthcare reform legislator himself feels the need to explain his definition in paragraph 2 of the same Article 642 stating that "Medical personnel is civilly liable for damages caused by error, which also include negligence, recklessness or insufficient medical knowledge in the exercise of the profession, through individual acts as part of the prevention, diagnosis or treatment procedures."

Thus, the legislator tries to get closer, by a roundabout way, to the essence of medical malpractice, necessarily evoking the ideas of fault and civil damages.

A more rigorous definition was given, as it was probably normal, by doctors in the annals of Constantin Brancusi University in Targu - Jiu "Medical malpractice is defined as unprofessional conduct, inferior to some standards of competence and skill set and accepted unanimously by the professional body, based on negligence or incompetence and which results in poor care with consequences for the patient."

We believe that the reference to the standards of competence and skill generally accepted by the professional body of doctors is the essence of any act of medical malpractice involving a violation of these standards. The only vulnerability of this definition in terms of legal effectiveness could be that currently in Romania there are no uniform standards of good medical practice for all specialties, situation in which the parties of a possible dispute resort to medical treatises devoted to each medical specialty. From a legal perspective, however, this is not a rigorous solution, so that a fair regulation of medical malpractice must be based on the adoption of uniform professional standards applicable to each medical specialty with the important remark that these standards should be updated to cope with the rapid developments of the medical

science. In their absence, medical malpractice and the other forms of liability of doctors will remain in the field of arbitrary and the professional destiny of doctors will continue to depend on the own professional interpretation given to a particular medical case either by the College of Physicians or by a body of experts whose organization raises serious questions about their independence and the European nature of the system they belong to.

THE INEFFICIENCY AND FUTILITY OF THE SPECIAL PROCEDURES COVERED BY THE LAW ON HEALTHCARE REFORM FOR MALPRACTICE CASES

Going beyond this theoretical discussion on the legal definition of medical malpractice, we note that in terms of actual approach by the legislator of malpractice and its consequences, the focus is on issues relating to the liability of the medical personnel and not on covering the damage caused to the patient, as it would be normal.

Even the name of Title XV of Law no. 95/2006 trenchantly raises the issue of civil liability of the medical personnel and of the provider of medical, healthcare and pharmaceutical products and services, and the regulation itself is full of references to medical liability, guilt, regulation procedures for various jurisdictions, including parallel jurisdictions, which only increase confusion and maintain the situation that existed before the issuance of the law, in which patients have as the only viable alternative the possibility to address to the civil or criminal courts to obtain redress.

Parallel jurisdictions to which we have referred, namely those organized at the level of the College of Physicians (Territorial Disciplinary Commission and High Commission for Discipline) and at the level of the public health authorities in the counties and in Bucharest (Commission of Professional Monitoring and Competence for Cases of Malpractice) have no competence in establishing the effective injury and much less in the effective indemnification which remains the exclusive jurisdiction of the courts.

Thus, any doctor suspected of malpractice is under disciplinary investigation for violation of the rules of good professional practice by the Disciplinary Commission (Article 442 of Law 95/ 2006 on healthcare reform), is being investigated by the Commission for malpractice for "professional error committed in the exercise of the medical act", and if there is a malpractice case, the same doctor will appear as a defendant in the trial for the effective establishment and provision of compensations to the patient.

Obviously, each special procedure (both the disciplinary procedure and the malpractice procedure) has its own remedies at law, including in court, so objectively a doctor accused of malpractice will inevitably spend a few years in these procedures, with everything they involve from a human, professional and financial point of view.

On the other hand, the injured patient also spends the same number of years with the same nefarious load meant to amplify the damage already suffered.

Disciplinary liability of doctors is engaged for non-observance of the professional medical laws and regulations, the rules of good professional practice and any facts about their occupation.

The body competent for the disciplinary case is the College of Physicians which the physician in question is a member of and which organizes disciplinary commissions that sit in panels of three members to

judge the complaint against the doctor. One of the members of the commission shall be appointed by the public health authority at the local level.

Against the decision of the Territorial Disciplinary Commission the interest parties may file an appeal to the High Commission for Discipline attached to the Romanian College of Physicians, which sits in panels of five members, one of whom is appointed by the Ministry of Health.

It is obvious that the establishment of a professional misconduct consisting in the violation of the good professional practice means in fact the confirmation of a case of malpractice.

However, the Disciplinary Commission only ascertains the facts leading to the engagement of disciplinary liability and possibly applies a disciplinary sanction. Only the sanctioned doctor can file a petition for annulment of the Commission's decision with the administrative court (Article 451of Law 95/ 2006). This limitation of access to a court, with the implicit exclusion of the complainer, raises serious questions about the procedure analysed.

In parallel, another procedure may take place before the Commission of Professional Monitoring and Competence for Cases of Malpractice organized at the level of Public Health Authorities in the counties and in Bucharest, composed of 13 members, two representatives of the county and Bucharest public health authorities, two representatives of the County Health Insurance House, two representatives of the County Colleges of Physicians, Dentists and Pharmacists, two representatives of the County Order of Nurses and Midwives and a forensic expert.

The Commission informed by the person who believes himself the victim of a case of malpractice or the successors of such a person, appoints experts and makes a decision on the case within no more than three months from the date of referral.

The decision i limited to determining whether or not there was a malpractice case, and can be challenged by any of the parties involved, including the insurer, at the court in whose jurisdiction the act of malpractice occurred.

Practically, however, neither the decision of the Disciplinary Commission nor the decision of the Commission for Malpractice rules with regard to the malpractice indemnities.

Thus, according to Article 17 of the Detailed Rules for the application of Title XV of the Law 95/2006 on healthcare reform, if the Commission determines that there is a malpractice, the competent court may order the liable individual to pay damages.

Therefore, the only practical efficiency of these special procedures may derive from the fact that the rulings pronounced may have the probative value of an authentic act in the court proceedings that will follow.

However, it is clear that either party may request the administration of judicial expertise on the existence or inexistence of a malpractice case, expertise that cannot be dismissed by the court because the trial must be fair and must meet the rigors of the principle of contradiction, so that the decisions of the above mentioned commissions will only be a piece of evidence in a set of evidence and the court will assess the entire ensemble.

Consequently, we can say that, since the regulation of these special procedures does not result in the actual repair of the damage and in the avoidance of court proceedings, they are clearly unnecessary.

Thus, it should be noted that the regulation of tort liability by common law and the provisions of the criminal law on bodily injury committed by fault, involuntary manslaughter, professional negligence and the others were more than enough for settling medical malpractice cases in courts.

CEDO VISION AND SOLUTIONS OFFERED BY OTHER LAWS FOR MALPRACTICE CASES

The purpose of the special regulation of medical malpractice through the Law on healthcare reform should be just the creation of a special, operational, efficient mechanism, able to establish the existence of a malpractice case, the patient's right to compensation and to lead to the effective provision of compensation, which the current legislation has not achieved, the proof being the fact that all malpractice cases that end up being compensated are settled exclusively by the courts, professional liability insurers often adopting the strategy of waiting for enforcement, in order to delay as much as possible the payment of compensations, practice also favoured by the recent amendment of the law establishing the creation of a premium reserve to the detriment of the insured.

In essence, starting from the definition and ending with the practical aspects of law enforcement, it is necessary to move the centre of gravity of the concept of medical malpractice to the idea of compensation, repair of damage caused to the patient, being well known that the effective exercise of medical professions involves inherent risks everywhere.

C.E.D.O. vision on medical liability follows the same direction, even in cases where the right to life is prejudiced. Thus, in the specific context of medical negligence, the prejudice to life is not voluntary and the obligation of states to organize an effective judicial system does not necessarily require in all cases recourse to criminal proceedings.

A remedy at law in front of civil jurisdictions, able to lead to the establishment of medical liability and the payment of damages, without excluding disciplinary measures against those who committed acts of medical negligence is considered to fulfil the obligation of states to protect the right to life and to conduct an effective investigation in cases of violation of this right. Even more so, in cases that involve minor prejudices affecting the right to bodily integrity, the access to civil jurisdiction and the establishment of equitable compensation, payable immediately, should be sufficient.

This is how the medical malpractice problem is solved in the reference countries in terms of efficiency of the health system. In Germany, trials for medical malpractice are often settled by the over 200 professional liability insurers after the mediation services of the medical associations performed the assessment. Only 8 % of the medical malpractice cases go to court, given that approximately 90 % of the population is included in the compulsory health insurance scheme. Only citizens with very high incomes are allowed to leave the mandatory system and be insured in the private system.

Specifically, the victim of medical malpractice goes to the insurer or the hospital to reach an agreement, and if an agreement is not reached, this may resort to a free mediation service or to court. Mediation centres are assisted by medical associations, self-governing bodies which define nursing standards, establishing medical profession competences; these bodies enjoy much respect for their independent decision. The personnel of the mediation centres is composed of lawyers and doctors, and assessments are often made *pro bono* by volunteer doctors. If the mediation centre decides that a doctor is responsible for injuries, the victim may resort to the professional liability insurer, most cases being solved based on the opinion of the mediation centre.

The German compensation amount is lower than in the U.S., compensation tables compiled based on jurisprudence and practice being published.

In the United Kingdom, the National Health Service (NHS) administers medical malpractice cases exclusively for the liability of the personnel employed in this service, money coming from the budget set by the Government. It is estimated that only 4% of the medical malpractice cases reach court, generally cases where claims are very high. The other cases are settled by the Litigation Authority attached to N.H.S., a special authority of the National Health Service, which administers the legal side of the claims and handles the payment of compensation.

CONCLUSIONS AND PROPOSALS DE LEGE FERENDA

An alternative solution has been proposed in the Romanian doctrine as well in the form of a draft law for the organization of a compensation system for medical accidents through extra-court settlement for establishing and paying expedient damages to patients through a National Authority for Patient Protection.

Considering all arguments and examples above, in the specific context of medical malpractice, we believe that a total change of the legal approach to medical malpractice is necessary, so that its definition should clearly evoke the idea of medical negligence, being completely irrelevant what type of fault is considered (incompetence or negligence), fault that forms the basis of the civil liability, the idea of injury and the idea of the patient's right to obtain compensation for this damage.

In conclusion, *de lege ferenda*, we propose the definition of medical malpractice as unprofessional behaviour of the medical staff and of the providers of medical, health and pharmaceutical products or services, inferior to, contrary to or inconsistent with medical standards, which by its negative consequences, physical or mental generated on the patient, entitle the latter to apply for and obtain fair compensation. We believe that once a correct conceptualization is done, it will also attract practical equitable solutions, consisting in the settlement of an effective extra-court procedure for compensating patients in medical malpractice cases.

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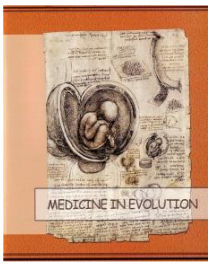
CYP2D6 ENZYMATIC DEFICIENCY AND EXTRAPYRAMIDAL SIDES EFFECTS IN AN AUTISTIC PATIENT TREATED WITH RISPERIDONE



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ABSTRACT

In this paper we provide a summary of one case report on a 10-year-old autistic patient who suffered from movement disorders while being treated with risperidone at 0.75mg/day. It was discovered that he has a cytochrome P450 2D6 deficiency, being genotype as a CYP2D6 intermediate metabolizer (IM), which may explain his extrapyramidal side effects. Although we expected that the active moiety of risperidone would be elevated, this was not the case. This is an example of the aid that pharmacogenetics can have to identify the risk of side effects, and to better guide the clinicians in personalizing therapeutic regims with less adverse reactions.

Key words: *Risperidone, CYP2D6 genotype, extrapyramidal syndrome*

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INTRODUCTION

Autism is a behavioral disorder diagnosed in childhood, characterized by difficulties in communication, stereotypical, repetitive behavior and decrease of patient's ability to interact socially. Although the specific causes are not yet understood, scientific evidence indicates involvement of both abnormalities in brain development and an important genetic factor. Besides educational and behavioral specialized interventions, pharmacological management can play a positive role in the treatment of autism related disorders such as depression, anxiety, hyperactivity, obsessive-compulsive behavior, auto and hetero aggression.

Risperidone is an atypical antipsychotic whose pharmacodynamic action is due to the dual dopaminergic (D2) and serotoninergic (5HT2) antagonism in the central nervous system. In October 2006, risperidone was the first drug approved by the Food and Drug Administration (FDA) for the treatment of irritability in children and adolescents with autism, between 5 and 16 years of age. Clinical efficacy of risperidone versus placebo was demonstrated in two clinical trials conducted over a period of eight weeks, which included 159 pediatric patients with autism. The instruments employed to assess reduction of irritability were Aberrant Behavior Checklist (ABC) and Clinical Global Impression - Change (CGI-C) scale. [1] Off-label risperidone is administered also in other behavioral disturbances associated with autism such as aggression, self-flagellation and spontaneous mood changes. [2]

Regarding pharmacokinetic properties, risperidone is metabolized in the liver by the CYP2D6 enzyme system. The CYP2D6 gene has several polymorphisms. The identified allelic variants can be classified as being:

- functional (e.g. CYP2D6*1 and *2)
- with reduced activity (e.g. CYP2D6*9, *10, *29, *36, *41)
- nonfunctional (e.g. CYP2D6*3-8, *18, *21, *44) [3].

The adverse effects occurring with a frequency greater than 5% suffered by pediatric patients with autism treated with risperidone, may include dizziness, constipation, dry mouth, sedation, fatigue, headache, weight gain and parkinsonian syndrome. Also neurological and other adverse effects have been reported, such as dyskinesia, neuroleptic malignant syndrome, impaired motor coordination, arrhythmias, hyperglycemia etc. [4].

CASE DESCRIPTION

A male patient aged 10, 31 kg, diagnosed with autism, was prescribed risperidone to improve aggressive behavior, 0.25 mg for 7 days, then 0.5 mg for 12 months. Subsequently, to better control the symptoms, the dose of risperidone was increased to 1 mg/day. Because there was an increase in the patient's irritability, it was decided to increase the dose to 2 mg/day divided in two doses, considering that these manifestations are due to disease decompensation as a consequence of the prepubertal stage of the child. 14 days after increasing the dose akathisia appeared, manifested objectively by extreme psychomotor agitation, stiffness and inability to control the motor function. It was decided to gradually reduce the dose of risperidone to discontinuation.

In order to ameliorate akathisia, treatment with propranolol was initiated for 30 days. Initiation and discontinuation of propranolol treatment was made by progressively

increasing respectively decreasing doses. It was noticed that administration of propranolol caused a distinct reduction in intestinal transit with occurrence of constipation.

Subsequently, reinitiation of risperidone therapy was decided, in progressive doses of 0.25 mg/day for 14 days, then 0.5 mg/day followed by 0.75 mg/day. At a dosage of 0.75 mg/day extrapyramidal adverse effects occurred, manifested by coreic movements especially of the hands. Analysis of plasma concentrations, of risperidone and of the active metabolite, for the three doses, was conducted (Table 1).

Table 1. *Risperidone dosage vs plasma concentration*

Test	Risperidone dosage (mg)	Test	Plasma concentrations (µg/l)	Ratio R:9-HO-R
1.	0.25	Risperidone	< 1.0 *	0.90
		9-HO-risperidone	1.1**	
2.	0.50	Risperidone	2.3 *	0.74
		9-HO-risperidona	3.1**	
3.	0.75	Risperidone	2.4 *	0.70
		9-HO-risperidona	3.4**	

**the reference value is 3-20 µg/l*

***the sum of risperidone and 9 – HO- risperidone should be between 5 – 100 µg/l.*

At present, after taking various other atypical antipsychotics, the patient is under treatment with risperidone, because it was the only drug that proved to be effective for the treatment of anxiety and aggressive manifestations associated with autism. Maintenance dosage which proved to be tolerated by the patient, was set at 0.5 mg/day in two divided doses.

According to the drugmaker's specifications, for the treatment of irritability associated with autism, the target dose of risperidone for patients > 20 kg is 1 mg/day. There are also clinical trials where the maximum daily dose was 2.5 mg for children > 20 kg, but at this dose the therapeutic effect has reached a plateau [5]. Although the dose administered to the patient fit in the therapeutic range, the occurrence of adverse effects imposed considerable reduction in the risperidone dosage.

Nowadays we know the importance of the allelic constitution of a certain patient for the correct dosage of medication so as to avoid the occurrence of adverse drug reactions. Thus, detection of genetic variations in the enzymes involved in the metabolism of risperidone was pursued, in order to investigate the patient's general ability to metabolize drugs and to find out if the patient has an increased risk of adverse drug reactions to therapeutic doses.

Since risperidone is metabolized by the CYP2D6 enzyme system, CYP2D6 Genotyping was decided and carried out too.

Analyses revealed heterozygosis for CYP2D6*4 allele (1846G>A) and CYP2D6*41 (2988G> A) – genotype *4*41. The presence of the inactive allele and of the low activity allele is associated with reduced enzymatic activity of CYP2D6, which means metabolizing capacity of substrates less than normal [6]. Phenotypically, like 10% of the Caucasian population, the patient falls into the group of "intermediate metabolizers". The result of molecular analyses also indicated a decrease of the CYP2C19 enzymatic function.

DISCUSSIONS

The first generation of antipsychotic (FGA) drugs were associated with different severity of extrapyramidal manifestation in an important percent of patients. The second generation of antipsychotics (SGA), especially those with lower dopamine receptors affinity were thought to have less adverse effects, but the majority of the reports showed that extrapyramidal manifestations can appear even after the use of SGA. [7]

Extrapyramidal manifestations are, in some cases, very severe and additional drugs can be necessary for those patients. Akathisia, also reported in this paper, is one of the clinical manifestation of the extrapyramidal syndrome that was reported after administration of FGA but also SGA. [8]

The main metabolic pathway of risperidone is hydroxylation to the active metabolite 9-HO-risperidone through the CY2D6 liver enzyme system. After administration of the antipsychotic, the clinical effect occurs due to the summing up of plasma concentrations of risperidone and its active metabolite 9-hydroxyrisperidone (active moiety). Initially they thought that polymorphism of the CYP2D6 gene, with reduction of metabolic capacity, has no clinical implications, since decreasing the concentration of the active metabolite 9-HO-risperidone is compensated by increase of the concentration of risperidone. Subsequently, clinical studies have found a correlation between CYP2D6 poor metabolizers and the increased incidence of extrapyramidal adverse effects following administration of risperidone, which would be in agreement with what we have noticed [9].

The occurrence of these adverse effects in patients who report high risperidone/9-HO-risperidone plasmatic ratio, may be explained by the different pharmacodynamic profile of the two compounds. In a review, Alamo et al. analyze pharmacological differences between risperidone and the active metabolite administered as a drug under the name of paliperidone [10]. Compared to ripseridone, 9-HO-risperidone has a higher rate of dissociation from the D2 receptors and a lower affinity to, adrenergic, muscarinic and 5HT2A receptors, hence the possible differences existing in therapeutic efficacy and the profile of adverse effects (10). Another study claims that the two compounds differ in terms of profile of the second messenger systems that they regulate [11].

Since the result of the genetic testing performed places our patient among intermediate metabolizers, we may assume that there is an accumulation of risperidone and the active metabolite, with prolonged half-life, which would explain the occurrence of adverse effects. But after determination of plasma concentrations following administration of different doses of risperidone, this seems underdosed, in spite of the adverse effects occurred. The analysis laboratory quotes Regenthal R, [12] for the reference values of these analyses. As far as we are concerned, we do not know, for pediatric patients, about the existence in literature of data exactly indicating the optimal plasma concentration for risperidone over which the risk of adverse effects exceeds the benefits provided by the treatment.

Specialized literature uses the R:9-HO-R ratio to assess the level of activity of CYP2D6. It was suggested that a plasma ratio R:9-HO-R between 0.1-0.3 indicates a normal enzymatic activity, the case of extensive metabolizers, while a value >1 is associated with lack of enzymatic activity and a poor metabolizer phenotype [13]. For our patient, CYP2D6 intermediate metabolizer, the

average ratio R:9-HO-R is 0.78, which is in trend with the things presented above. The importance of establishing the CYP2D6 genotype in patients treated with risperidone was sugested by several studies that included chohorts of children and adolescents under treatment with risperidone. [14, 15]

CONCLUSIONS

Thus, to implement a personalized therapy with risperidone, we maintain that CYP2D6 genotyping, or monitoring plasma concentrations and calculating the ratio R:9-HO-R, can be useful tools in choosing the correct dosage regimen for risperidone so as to avoid the occurrence of adverse drug reactions.

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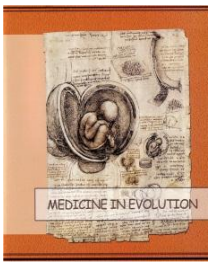
ASTHMA COPD OVERLAP SYNDROME – A NEW CLINICAL ENTITY?



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ABSTRACT

Obstructive pulmonary diseases, such as asthma and chronic obstructive pulmonary disease (COPD), share three pathological features: airway inflammation, airway obstruction and bronchial hyperresponsiveness. In 1995 American Thoracic Society guidelines identified eleven distinct obstructive syndromes, six of them presenting overlap characteristics. Despite this, asthma and COPD were still considered two different diseases, with different treatment and prognostic. In 2014 a joint Global Initiative for Asthma and Global Initiative for Chronic Obstructive Lung Disease consensus recognized asthma-COPD overlap syndrome (ACOS) as part of the obstructive airways syndrome family. ACOS was defined as a persistent airflow limitation characterized by common features between asthma and COPD. The main objective of the common consensus is to encourage further study regarding this syndrome. This mini-review will present the clinical characteristics of the ACOS and current perspectives.

Key words: *asthma, COPD, overlap syndrome*

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INTRODUCTION

Asthma and chronic obstructive pulmonary disease (COPD) are the two most common pulmonary obstructive diseases characterized by chronic inflammation and bronchial obstruction. Despite these similarities, they are known to be two distinguish diseases with different treatment and prognostic. Asthma is characterized by chronic inflammation and airway hyperresponsiveness and affects over 300 million people worldwide[1]. It usually develops in children or young adults. Genetic atopy or viral infections during infancy are mentioned as risk factors. The inhaled corticosteroids are considered to be the most effective for controlling the disease[1]. Although the suspicion of asthma is raised by the clinical aspect, the diagnosis is confirmed by lung function tests: reversible and variable airflow limitation. COPD stands for a persistent and progressive airflow inflammation associated with chronic inflammation. It is usually diagnosed in middle-age adults with a history of smoking or exposure at environmental toxins. Lung function tests show a non reversible obstructive syndrome. Smoking advices and bronchodilators are the preferred therapeutic approaches. The worst prognostic is due to comorbidities of the patients[2].

Theoretically, the differential diagnosis between the two diseases should be easy to make. But there is not always the case. For exemple, in COPD we find mainly chronic obstruction, non reversible after bronchodilators. However, in time, these patients may have different responses at reversibility test due to dichotomising, characteristic that is being exploited by epidemiological studies[3]. Regarding chronic inflammation it is known to be eosinophilic and driven by CD4 in asthma and neutrophilic and driven by CD8 in COPD. But there is neutrophilic inflammation in asthmatics who smoke, which leads to an accelerate decline in lung function despite maximal treatment. On the other hand, there are COPD patients with sputum eosinophilia or positive reversibility test as it was shown in UPLIFT study[4]. According to a group of British researchers, this category of patients presents a lower frequency of exacerbations and a slower decline of FEV1 under inhaled corticotherapy[5]. Airway remodeling causing obstruction is found throughout entire respiratory tract, but it is more important in the small airways. These changes proven by high resolution CT scan are seen in asthma and COPD, as well as in overlap syndrome[6]. Prevalence of bronchial hyperresponsiveness increases with age and smoking. Its presence was proved in asthma patients and up to 30% of COPD patients[7]. It was even suggested that the use of provoked bronchial hyperresponsiveness can be useful in the diagnosis of overlap syndrome in COPD patients with airflow obstruction[8].

So what should a clinician do when he finds himself in front of a patient that presents symptoms borrowed from both diseases? The simple answer is to consider one of two diagnoses, but this may lead to treatment mistakes[9]. The complex answer is to admit the possibility that a patient may present both diseases, under the name "Asthma COPD Overlap Syndrome" (ACOS).

THE EVOLUTION OF OVERLAP SYNDROME CONCEPT

In 1995, American Thoracic Society (ATS) guidelines identified eleven distinct obstructive syndromes, six of them presenting overlap characteristics. This category was called "asthmatic bronchitis". But no

other attempts were made to determine the phenotype or to define the appropriate treatment until recently.

In 2003, a new phenotype among COPD patients was described, called "asthma-COPD overlap syndrome". This term refers to patients of at least 40 years old, with COPD characteristics, which presented symptoms of asthma earlier in life and were treated according to that. The prevalence of this phenotype is estimated at 13-20%[10] and increases with age: 40% between 60-69 years, 60% between 70-79 years old, with an increase up to 50% in elderly patients[11].

In 2009, Gibson et al tried to underline the importance of diagnosing overlap syndrome in order to personalize the treatment according to patient's needs, to identify the mechanisms that may lead to the development of COPD. Even though both asthma and COPD are characterized by dyspnea, authors pointed out that all pulmonary obstructive diseases have clinical similarities, therefore the sensitivity and specificity of symptoms are limited. Furthermore, not even the reversibility test can be considered infallible, due to patients with long acting asthma with incomplete reversibility or non-smokers who develop COPD. The authors studied 44 adults over 55 years old previously diagnosed with obstructive pulmonary disease. The prevalence of overlap syndrome in the study group was 65%. The features of patients with overlap syndrome were more similar with the ones of COPD: predominantly ex-smokers, with intermediate rate of atopy between asthma and COPD, frequent presence of chronic bronchitis and bacterial colonisation as in COPD, neutrophilic inflammation of the airways. They concluded that overlap syndrome may be found in older people with neutrophilic bronchitis and it may be caused by the decline in lung function[12]. Regarding treatment, the authors suggested the need of randomized trials.

Another study compared the prognosis and quality of life in 1546 patients previously diagnosed with asthma, COPD or overlap syndrom[13]. This study showed that patients with overlap syndrome had the poorest score of health-related quality of life. Also, a study that included 3885 asthmatic patients, from which 17.4% had overlap syndrome, stated that these patients had more frequent exacerbations, more severe symptoms and a lowest score at St George's questionnaire[14].

So far it was concluded that overlap syndrome is a real clinical entity which borrows characteristics from asthma and COPD and has a worst prognosis. The question that raises is what if the response at treatment may be improved? The fact that in overlap syndrome we may find airway inflammation with preferential recruitment of eosinophils may translate into a clinical benefit of corticosteroids treatment. But the GOLD guidelines recommend inhaled corticoids in severe or exacerbated COPD. There is a need for further trials, but unfortunately both these patients are always excluded from clinical studies for both COPD and asthma. That is why several groups of specialists tried to define the correct therapeutic attitude for the overlap syndrome. In 2011 a group of Spanish pneumologists reached a consensus to define a "mixed COPD-asthma" phenotype. The diagnosis of this syndrome is based on two major criteria or one major criteria and two minor criteria (Table I). Regarding treatment, the Spanish researchers consider that these patients could benefit from inhaled corticoids associated with long acting beta2-agonists or long acting muscarinic antagonists. The same opinion is shared by the Canadian and Japanese guidelines that have shown a clinical improvement after inhaled corticoids

in mild to moderate COPD with eosinophilic component[15,16].

In 2013 an article regarding pharmacotherapeutic considerations in ACOS was published. The definition of overlap syndrome was based on the presence of one of two clinical phenotypes described in figure 1[18]. Even though each disease alone (asthma and COPD) has a progressive decline in lung function and quality of life, the authors suggested that ACOS represents a population with worse outcome, with three times more exacerbations[10,17]. The most important risk factors suggested for overlap syndrome were smoking, atopy and age >40 years old. Although the prevalence of smoking was well studied in COPD population, little is known about smoking and asthma. Hardin et al proved based on CT-scan findings there is no difference in degree of emphysema between COPD and ACOS patients, suggesting that FEV1 decline in overlap syndrome is due mainly to airway inflammation[10]. Regarding age, the physiological decline of respiratory function in older people should be taken into consideration. In the experience of Zeki and al[17], the mean age of ACOS patients (66.7 years) is somewhere in the middle between the asthmatic (51.3 years) and COPD population (72.4 years). Regarding treatment of ACOS, the authors concluded that the main target should be decreasing the number of exacerbations; they recommend inhaled corticotherapy as first line therapy, associated with bronhodilators or leukotriene receptor antagonis[18].

In the search for finding further diagnosis criteria for overlap syndrome the value of biomarkers was discussed. A team lead by Iwamoto searched the prevalence of plasma and sputum biomarkers in five groups: non-smokers, smokers, asthma patients, COPD patients and ACOS patients. The results showed that sputum neutrophil gelatinase associated lipocalin is significantly increased in patients with overlap syndrome, more than in COPD group, suggesting the epithelial injury in ACOS[19].

Table I. *Diagnosis of "mixed COPD-asthma" phenotype, Spanish consensus*

Diagnostic criteria of "mixed CPOD-asthma phenotype"	Type of criteria	% of agreement
Very positive bronhodilator response (FEV1 > 15% and > 400 mL)	Major	83
Eosinophilia in sputum	Major	78
History of asthma before 40 years old	Major	78
High total IgE	minor	50
History of atopy	minor	50
Positive bronhodilator response (FEV1 >12% and > 200 mL)	minor	39

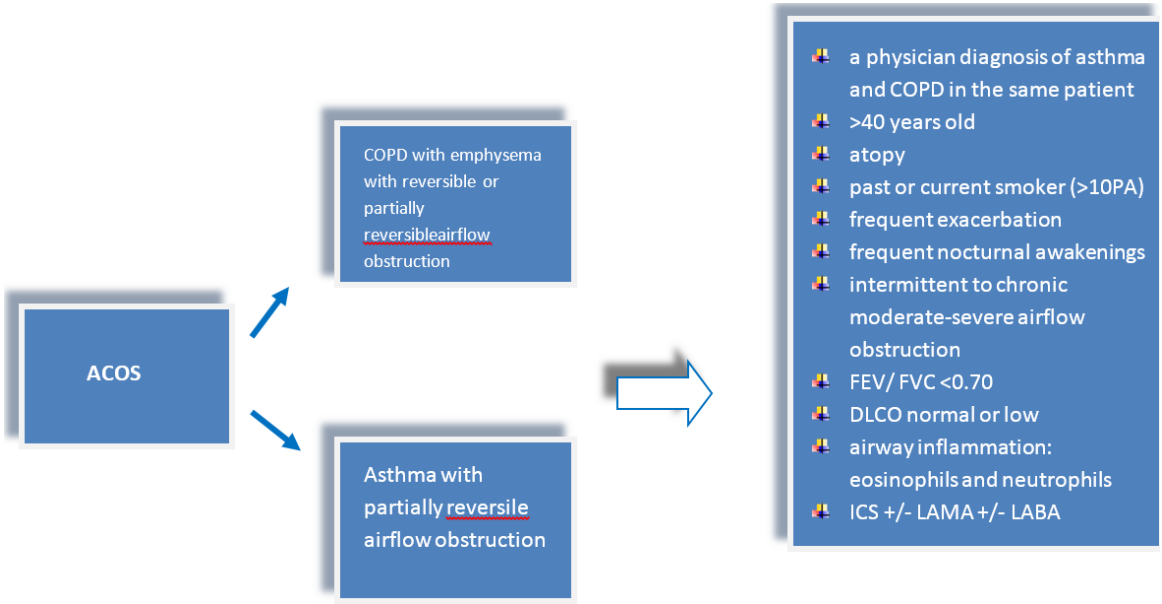

Figure 1. Asthma-COPD overlap syndrome definition in 2013

ACOS - asthma-COPD overlap syndrome; COPD - chronic obstructive pulmonary disease; DLCO - carbon monoxide diffusing capacity; FEV1 - forced expiratory volume in first second; FVC - forced vital capacity; ICS - inhaled corticosteroids, LABA - long acting β2 agonist; LAMA - long acting muscarinic receptor antagonist; PA - package years.

ACOS IN TODAY'S PERSPECTIVE

Even though there are many reports of ACOS which describe similar clinical findings and treatment options we still need an universal consent. Finally, in 2014, a joint GINA and GOLD project recognized ACOS as part of the obstructive airways syndrome family. The main objective of this common consensus is to encourage further studies regarding this syndrome[20]. This consensus designed an algorithm to help diagnose and treat ACOS. The first step is to recognize the obstructive chronic airway disease. This can be accomplished by regarding into the medical history of the patient, conducting a physical exam and paraclinical investigations. The findings may vary from normal to asthma specific characteristics or COPD features. That is why the best approach is to focus on patients who seem to fit in both categories, as described in table II. If a patient presents three or more features for either asthma or COPD, diagnosis of ACOS is probable. But the absence of any characteristic from table II does not necessarily exclude the diagnosis of asthma or COPD. Regarding screening questionnaires, the authors find them useful to identify chronic obstruction, but not the overlap syndrome due to context-specificity. Finally, the consensus speaks about the need for further investigations if the diagnosis is uncertain or if the treatment response is not according to expectation: arterial blood gases, airway hyperresponsiveness, pulmonary CT scan, inflammatory biomarkers, fractional exhaled nitric oxide (FENO), blood eosinophilia, sputum cell. As in any other obstructive airway disease, pulmonary respiratory tests remains the main tool in diagnosing ACOS. The findings in overlap syndrome consist of: IT<70%, FEV1 <80% of predicted, post bronchodilator increasing in FEV1 >12% and 200 ml (when FEV1 is low) or 400ml. Of course in interpreting the result we should take into consideration current clinical status of the patient and current treatment. As for peak expiratory flow it can be used to prove a high variability usually present in asthma, which can also be found in ACOS. The most important chapter of this consensus remains the

appropriate treatment. So far there were many group studies focused on ACOS features, from which only a few stated an opinion regarding treatment[9,15,16]. In this paper clinicians are advised to treat a patient with suspicion of asthma or ACOS in which COPD is unlikely with asthma specific treatment, according to GINA. So inhaled corticotherapy should be started with the possibility to associate a long acting beta 2 agonist. Also we should add other therapeutic measures suggested in GOLD such as smoking cessation, pulmonary rehabilitation, vaccination and finally treatment of comorbidities. Given the worse outcome registered in overlap patients, the authors recommend that the treatment should be managed by specialists, not by primary care physicians. As a conclusion, the consensus states that is a real need for trials dedicated to ACOS patients in order to establish long term benefits of current therapeutic strategy.

Table II. *ACOS features according to GINA and GOLD consensus 2014*

Feature	Asthma	*ACOS*	COPD
Age of onset	< 20 years old	*>40 years old with prior symptoms*	>40 years old
Risk factor	Atopy, asthma in the family	*Prior diagnosis of asthma or COPD*	Smokers, exposure to pollutants
Symptoms	Variable	*Persistant or variable*	persistant
Airflow limitation	Variable	*Persistant*	Persistant
Lung function	IT normal or reduced FEV1 Post BD: >12% and 200 mL	*IT reduced FEV1 Post BD: >12% and 200 mL*	IT normal or reduced FEV1 Post BD: <12% and 200 mL
Chest X-ray	Normal	*Hyperinflation*	Hyperinflation
Airway inflammation	Eosinophils and possible neutrophils	*Eosinophils and possible neutrophils*	Neutrophils with possible systemic inflammation
Exacerbation	Frequent	*More frequent than in asthma or COPD*	Less than in asthma
Prognosis	Improved by treatment, rarely evolution to fixed limitation	*Partially improved by treatment, progressive despite treatment*	Slowly progressive despite treatment

CONCLUSIONS

Although asthma and COPD are two distinct diseases, especially old patients share characteristics of both diseases. The presence of features from both entities in the same patient has an impact on the response to treatment, prognosis and finally on health care costs. That is why it is important to become familiar with the management of ACOS. The overlap syndrome has been recognized for years now as a merge between asthma and COPD. All the authors who have studied this syndrome concluded that ACOS has a worse prognosis and an increased risk for frequent exacerbations. The results of their studies suggest that these patients may benefit from a personalized follow up after hospital discharge. The treatment of ACOS patients is not well established. Several publications, such as Spanish, Canadian and Japanese guidelines suggested a benefit from inhaled corticosteroids. Even the consensus between GINA and GOLD mentions that ACOS should be treated with asthma medication, but there are no references for long term benefits or the impact on exacerbation frequency. We need clinical studies dedicated to patients with overlap syndrome to further explain the pathways in the development of COPD and to develop

the best therapeutic strategy. Until the results of those studies, we should keep in mind the possibility of overlap syndrome in a patient with pulmonary obstructive syndrome refractory to treatment. The patient with ACOS suspicion should be treated according to current consensus.

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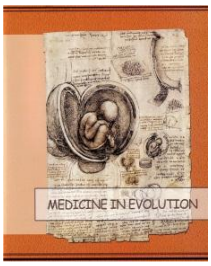
THE IMPLICATIONS OF PSYCHOSOCIAL FACTORS IN THE ONSET OF BREAST CANCER



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ABSTRACT

Modern life subjects the individual to a lot of pressure without necessarily triggering the disease to everybody. The question that underlies this study is: "what are the psychosocial factors that trigger this malignancy?".Breast cancer is the second cause of death in women, after lung cancer. Breast cancer can be an inherited problem, but also age, hormonal factors, nutrition, stress, unhappiness, negative emotional feelings etc. can cause breast cancer.

Key words: *breast cancer, psychosocial factors, stress*

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INTRODUCTION

Breast cancer constitutes an important cause of morbidity and mortality, representing the second leading cause of death in women. According to the World Health Organization, more than 1.2 million people are diagnosed with breast cancer each year and more than 500,000 will die because of this disorder. Breast cancer mortality rate has decreased since 1990 due to early diagnosis and improved treatment methods.

Breast cancer is a complex and traumatic disease. In the case of a breast cancer diagnosis, the treatment is somatic, closely accompanied by a psychological one.

The connection between emotional states and cancer was referred to for centuries. Psychosomatic researchers have triggered a series of studies regarding the premorbid personality of cancer patients, the consequences of stress, the variables and behaviors involved in the cancer's apparition and the adaptation to the disease.

"Generating somatic suffering are primarily large emotions, emotions of shock, trauma, emotional stresses, great emotional trauma, emotional shocks and in particular, the emotions that do not discharge in an exterior manifestation, withheld and inhibited emotions" [1].

Psychological and psychosocial aspects associated with breast cancer have received greater attention over the past 30 years due to the prevalence and mortality recorded during this period.

People prone to cancer and those to which the disease has been triggered are:

- excessive obedient;
- conciliatory and benevolent towards hierarchical superiors or towards people perceived to be stronger;
- overly shy;
- patient;
- interiorized and inclined to repress negative emotions (especially anger) instead of expressing them [2].

Stress "is the body's adaptation program to a new situation, its response to nonspecific and stereotypical stimuli that disrupts its balance personal" [3]. Each of us is endowed with a certain amount of " stress energy " that is irrecoverable through relaxation and it should be used sparingly throughout life, one that consumes too much of this energy is doomed to die early, and old age would be just this energy's depletion. Studies related to the Interaction between stress and personality, are producing evidence confirming the existence of the link between the type of personality and the disease. So the cancerous disease falls within the pathologies resulting from stress but also capable of generating stress [4].

Objective

The present research aims to establish the psychological causes that determine the disturbance of the psychic and immune systems, contributes to the occurrence of breast cancer, as well as demonstrating the relationship between these two issues.

Regarding this matter, a study has been conducted on patients diagnosed with breast neoplasm, in the oncology clinic from the municipal hospital in Timisoara.

Group

The study was exploratory, it studied patients with breast neoplasm that presented themselves in the Oncology clinic Municipal Hospital Timişoara in October 2014- May 2015.

The purpose was the formation of a group of patients whose diagnosis included the breast cancer phenomenon, from its apparition to its development and the applied treatment, with all the variety of effects

that caused physical and psychological discomfort.

The studied group was represented by 136 patients, aged between 29 and 82 years old, represented on three time periods (Fig. 1).

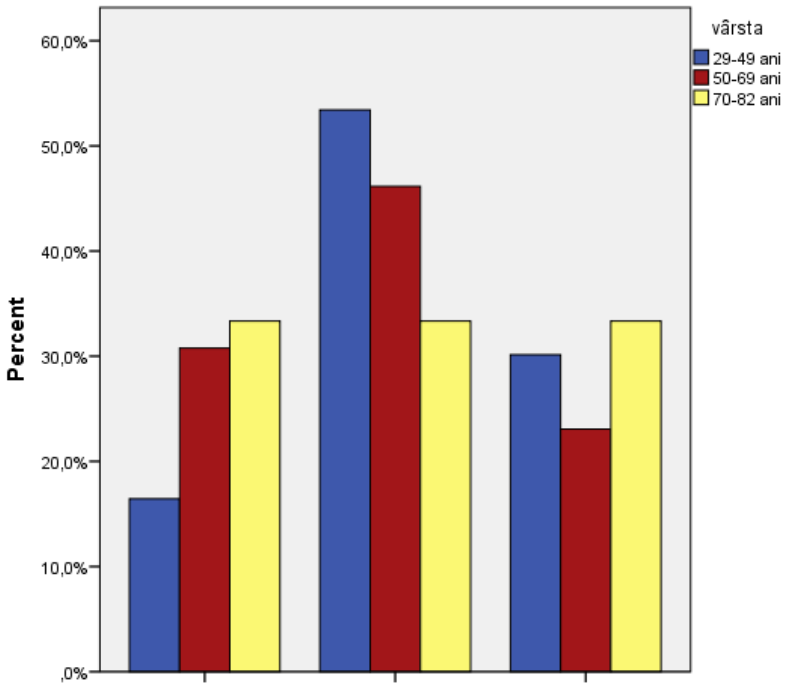

Figure 1. Graphical representation of patients by age

METHODS

Through detailed anamnesis, and through the application of tests batteries (stress scale of Holmes and Rahe), the test concerning the unhappiness assessment of the different areas of life, an attempt was made to establish psychological causes that may contribute to the occurrence of breast cancer.

To measure stress according to the scale of stress of Holmes and Rahe, the number of life changes are gathered <<life change units>> which are applied to events from the last year in the life of the patient, and the final score will give you an approximate estimation related to how much health is affected by stress.

The questionnaire of unhappiness evaluation addresses the following major fields of life: death of a friend, divorce, the relationship with her husband and children, illnesses, household chores, financial situation, unemployment, anxiety, unresolved emotional suffering, social life, disappointment, loneliness, depression, personal independence, a tainted way of life and life satisfaction.

Each area of life is rated on a level from 1 to 10, where:

1 – represents increased level of unhappiness

10 – represents low levels of happiness/unhappiness

Investigated subjects were asked to answer in a verbal and written manner, applying the scales of used tools running in the form of a semi structured interview amply.

All subjects were guaranteed confidentiality and anonymity for their responses, explaining them that there are no correct or incorrect answers.

The selection of participants was achieved through the random

technique, on a voluntary basis, they were notified in relation to their rights, thus obtained their consensus. Participants have been communicated the study objectives.

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RESULTS

As a result of statistical processing of the test that measures the causes of unhappiness, the following results were obtained: 63 patients had a close person's death as a cause with a percentage of 46%, 28 patients had disappointment as a cause (20%), 20 patients had divorce as the shutter domain (15%) and depression cause (19%) (Fig. 2).

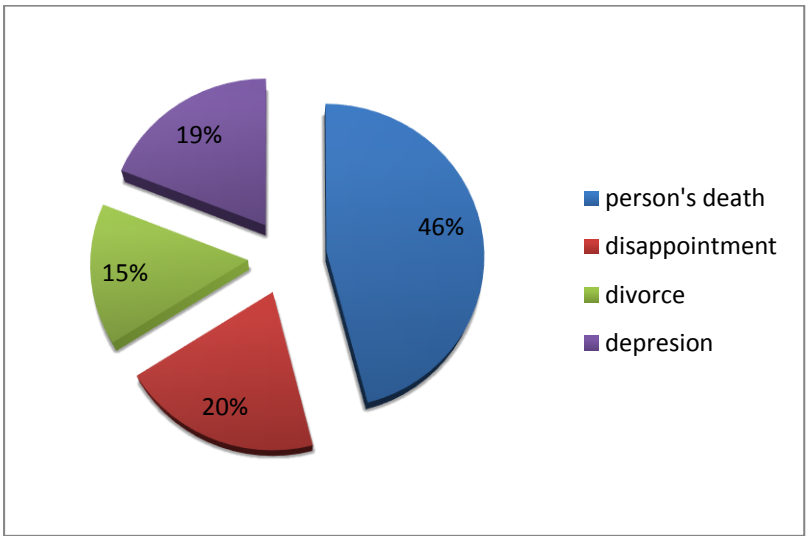

Figure 2. Graphical representation of patients, the causes is unhappiness

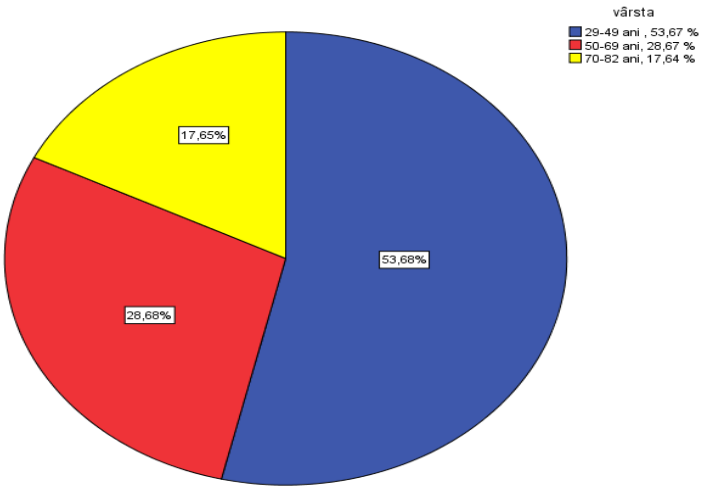

Figure 3. Graphical representation of patients at different age ranges, the causes is unhappiness

Table 1. *The relationship between age and unhappiness fields*

Areas of life which assesses unhappiness	**29-49 aged 73 patients**		**50-69 aged 39 patients**		**70-82 aged 24 patients**	
	media	**percentage**	**media**	**percentage**	**media**	**percentage**
Person's death	6,9178	*53,7%*	7,1282	28,7%	6,9167	17,6%
Divorce	6,5205	*53,7%*	6,9744	28,7%	6,8750	17,6%
Husband relationship	6,9041	*53,7%*	7,1795	28,7%	6,9167	17,6%
Children relationship	6,9452	*53,7%*	7,2564	28,7%	6,9167	17,6%
Disease	6,9589	*53,7%*	7,3077	28,7%	6,9167	17,6%
Home stuff	6,5753	*53,7%*	6,7949	28,7%	6,7500	17,6%
Precarious financial situation	6,7671	*53,7%*	7,1282	28,7%	6,7500	17,6%
Unemployment	6,9589	*53,7%*	7,3590	28,7%	6,7917	17,6%
Anxiety	7,1644	*53,7%*	7,3846	28,7%	7,1250	17,6%
Emotional suffering	7,2329	*53,7%*	7,5385	28,7%	7,1667	17,6%
Social life	7,2055	*53,7%*	7,4615	28,7%	7,0833	17,6%
Disappointment	7,2466	*53,7%*	7,4872	28,7%	7,2500	17,6%
Loneliness	7,1644	*53,7%*	7,4872	28,7%	7,1667	17,6%
Depression	6,2877	*53,7%*	6,5128	28,7%	6,3333	17,6%
Personal independence	7,1096	*53,7%*	7,3333	28,7%	7,0000	17,6%
Lifestyle	6,8767	*53,7%*	7,1282	28,7%	6,7917	17,6%
Life satisfaction	6,4932	*53,7%*	6,7179	28,7%	6,6250	17,6%

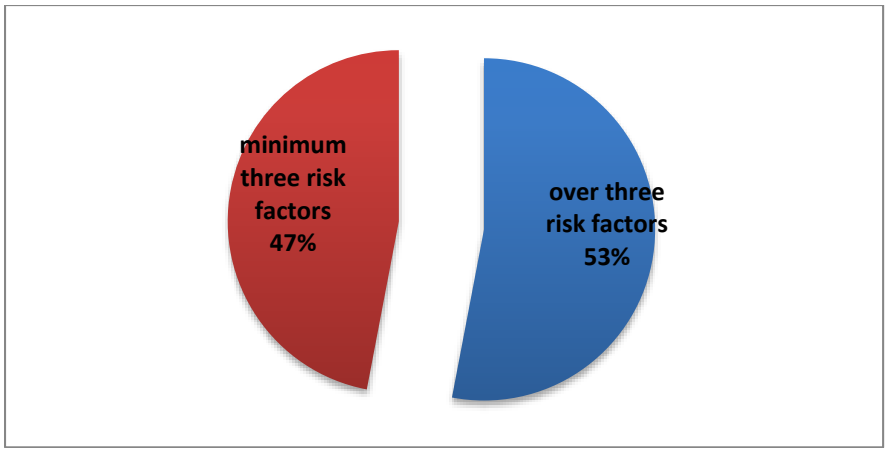

Figure 4. Graphical representation of patients depending on risk factors

To measure stress according to the scale of stress of Holmes and Rahe, I gathered the number of life changes < life change units > that happened in the last year in the lives of 136 patients studied in different age categories.

A. The group of patients aged between 29 and 49-year-old
B. The group of patients aged between 50 and 69-year-old
C. The group of patients aged between 70 and 82-year-old

Thus, the first batch of patients aged between 29 and 49-year-old lists a number of 63 persons who have obtained a score of 335 points, which means that they present an increased level of stress (46%).

The second group of patients aged 50-69 years, presents a number of 45 people who have obtained a score of 258 points, which shows a moderate level of stress (33%).

The last group of patients aged 70-82 years, comprises a number of 28 people who have obtained a score of 144 points, so it presents a low level of stress (21%) (Fig. 5).

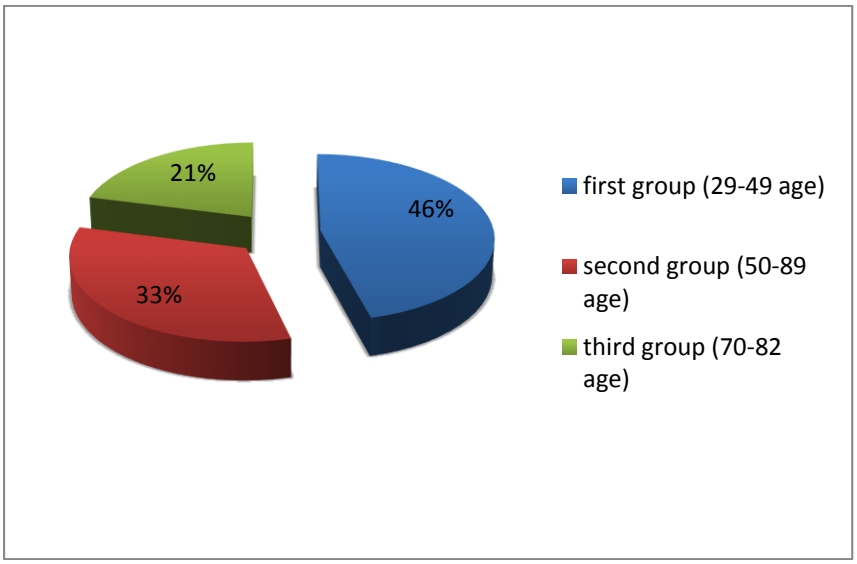

Figure 5. Graphical representation of the stress level on age range

The results obtained at the Holmes and Rahe scale show that stress represents an increased risk to individuals aged between 29-49 and 50-69 years and decreases with age.

CONCLUSIONS

The conclusion, as a result of this research, is that the incidence of breast cancer is primarily higher in subjects that are subjected to prolonged psychological stress that acts in the organic plan. Stress, in its complexity, determines the emergence of imbalances on an affective level, with major consequences in relation to the organic and physiologically level.

Stress is presenting a particular importance not only by itself (intensity, duration), but also how individuals react to it;

Stress is a major risk factor and it causes a faster triggering in cancer. This fact is proved even by the patients from the studied group, 46% had the cancer triggering cause - the death of close person, 20 percent disappointment, 15% of patients - divorce, and the remaining 19% had depression as the cause. The number of patients that have presented at least three risk factors was fewer than the number of patients who have more than 3 risk factors.

It is certified through this study, the fact that the negative emotions that affect life, are manifesting themselves through disease or disturbances which lead irretrievably, to a decrease in the probability of existence.

It was found that the cancerous disease falls within pathologies arising from unhappiness and stress, but at the same time, capable of generating them.

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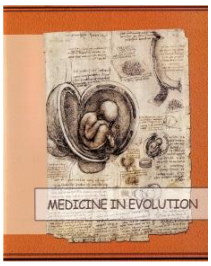

FACTORS INVOLVED IN THE PROGNOSIS, EVOLUTION AND MANAGEMENT OF PATIENTS WITH ACUTE STROKE IN THE INTENSIVE CARE UNIT. A RETROSPECTIVE STUDY

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ABSTRACT

The length of stay is the major determinant of cost-determining factor during acute stroke hospitalization. Increased age, number of comorbidities and significant disability on discharge have been shown to influence length of stay in hospital in acute stroke patients.

This study aimed to identify some of the clinical predictors of prolonged hospital stay and the mortality rate after acute stroke in a retrospective analysis of data from Intensive Care Unit of the Emergency Clinical County Hospital Timisoara, Romania. In this single center retrospective study we analyzed data obtained from 595 patients admitted in Intensive Care Unit, between January 2012 and December 2014, men and women, aged 25 to 80 years old, with a certain diagnosis of stroke. We separated patients from the ischemic stroke group and from the haemorrhagic stroke group and analysed the mean age, duration of hospitalisation, hours of mechanical ventilation and comorbidities, all related to the mortality rate. Our results indicated that sex, age, duration of mechanical ventilation and comorbidities are relevant factors influencing the period of time of hospitalization after acute stroke and the mortality rate. Therefore, a good treatment of medical comorbidities and prevention of potentially modifiable risk factors are important keys in prevention of stroke.

Key words: *Stroke, Ischemic, Haemorrhagic, Management*

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INTRODUCTION

Stroke is defined as an acute focal neurological deficit caused by cardiovascular disease, which lasts longer than 24 hours or is causing death before 24 hours [1]. Brain tissue infarction (ischemic stroke) occurs as a result of inadequate perfusion derived from occlusion of cerebral blood vessels in combination with inadequate collateral circulation [1]. A hemorrhagic stroke is defined as an acute, spontaneous, nontraumatic extravasation of blood into the brain parenchyma which may extend to the ventricular system or subarrachnoid space [2].

About 795,000 Americans each year suffer a new or recurrent stroke. That means, on average, a stroke occurs every 40 seconds. Stroke kills nearly 129,000 people a year. It is the fifth cause of death in the whole world. On average, every 4 minutes someone dies of stroke. About 40 percent of stroke deaths occur in males and 60 percent, in females [3]. Other statistics show that stroke is the third leading cause of death worldwide, after cardiovascular diseases and neoplasms [4]. An economical evaluation is essential for an appropriate allocation of available resources. A particular attention should focus on the calculation for cost of the inpatient stay, cost of the medical staff, diagnostics, tests and drugs in the acute phase, followed by an analysis of expenses for residential or nursing homes.

Aim and objectives

The length of stay is the major determinant of cost-determining factor during acute stroke hospitalization [5]. The length of stay may reflect the impact of the differences in health care system organization all around the world. Shortening the length of stay and using the bed and personal resources more efficiently are ways to achieve high patient turnover and, subsequently, provide more effective acute care for stroke patients [5, 6]. Increased age, number of comorbidities and significant disability on discharge have been shown to influence length of stay in hospital in acute stroke patients [7, 8].

This study aimed to identify some of the clinical predictors of prolonged hospital stay and the mortality rate after acute stroke in a retrospective analysis of data from Intensive Care Unit of the Emergency Clinical County Hospital Timisoara, Romania.

MATERIAL AND METHODS

Patients and inclusion criteria

In this single center retrospective study, we analyzed data obtained from patients admitted in the Intensive Care Unit between January 2012 and December 2014. Patients with the following diagnosis were selected for further detailed analysis: documented clinical and imaging (computed tomography or magnetic resonance investigations) diagnosis of stroke (ischemic or hemorrhagic); men and women, aged 25 to 80 years old. Exclusion criteria were: traumatic brain injuries; patients younger than 25 or older than 80 years; patients with uncertain diagnoses, suspected brain tumor, encephalitis or meningoencephalitis with acute onset, Todd`s paralysis, syncope, epilepsy, drug intoxication, poliomyelitis, migraine. A complex statistical analysis was performed regarding age, sex, length of ICU stay, discharge status (deceased or improved), duration of endotracheal intubation and patients` comorbidities.

Statistical analysis

Quantitative variables like age and lenght of ICU stay were described

by mean ± standard deviation. Data for major outcomes were expressed as numbers and percentages for both groups of pacients. For comparison of the variables the t test was used. Statistical significance was defined as $p < 0.001$. Analysis was performed with Microsoft Office Excel for Mac 2011 v.14.4.7. (Microsoft Corporation) and Prism 6 for Mac OS X v.6.0. (GraphPad Software, Inc.).

Ethical approval

The Ethical Committee of The Emergency Clinical County Hospital Timisoara approved the use of the patients' clinical and demographic data. Informed consent was waived off, because of the retrospective nature of the study.

RESULTS

4,210 patients were admitted in the Intensive Care Unit of our hospital between January 2012 and December 2014. 595 patients (15% of them) got a certain diagnosis of acute stroke.

Data on 595 patients with acute stroke were collected retrospectively from an ICU registry during this period of time. These patients were admitted consecutively in the Intensive Care Unit of the Emergency Clinical County Hospital of Timisoara, Romania. Clinical data were included into the database accordingly to a standard protocol.

Our institution is an acute care university hospital in the city of Timisoara, with over 1,000 beds, and serves a population of around 700,000 people. All patients presenting with cerebrovascular diseases are initially attended in the Emergency Department and then admitted in the Department of Neurology. Patients were admitted in the Intensive Care Unit only if there was a certain reason to suspect a life threatening acute cerebrovascular event.

For the purpose of this study, data from patients with ischemic stroke (n = 106) and haemorrhagic stroke (n = 489) over a 3 years period of time were collected. Prolonged length of hospital stay was defined as 14 days or more.

All patients were admitted in the hospital within 48 hours of the onset of symptoms. On admission, demographic characteristics, clinical and neurological examinations, laboratory tests (blood cell count, biochemical profile, serum electrolytes), chest radiography, twelve-lead electrocardiography and brain CT and/ or MRI were recorded. Demographic and clinical characteristics of the studied population are presented in Table 1.

From all the 595 patients with stroke, representing 15% from the total addmissions in ICU, 83% (489 patients) had haemorrhagic stroke and 17% (106 patients), ischemic stroke. Patients with haemorrhagic stroke were classified into intracerebral haemorrhage – 9% (42 patients) and subarrachnoid haemorrhage – 91% (447 patients); patients with ischemic stroke were divided into: left hemisphere – 64% (68 patients) and right hemisphere – 46% (58 patients).

Mortality rate of all the patients admitted with stroke, regardless of the etiology, was 60% (360 patients). The mean age of the admitted patients was 59±12.8 years old (with limits between 25 and 80 years old).

Depending of the type of stroke the study group was divided into 2 categories: ischemic stroke group and haemorrhagic stroke group.

Ischemic stroke group: 106 patients had ischemic stroke at the admission time (17% from all the patients admitted with stroke in the Intensive Care Unit). The patients from this group had a global mortality rate of 75% (80 patients). The mean age of the group was 65.32±10.69; the deceased patients from this group had a mean age of 66.56±14.39.

Haemorrhagic stroke group: 489 patients had haemorrhagic stroke at admission (83% from all the patients admitted with stroke in the Intensive Care Unit). This group had a global mortality rate of 54% (268 patients). The mean age for the haemorrhagic stroke group showed different results: the mean age of the group was 57.58±4.85, while for the deceased patients the mean age was 60.56±5.88 ($p < .0.001$).

The lenght of hospitalization varried between one day and 330 days, with an average of 11.58 ± 23.18 days. Analysing the duration of ICU stay, we have differenttiated the duration of hospitalization related to stroke type (Figure 1).

The number of admissions for the patients with haemorrhagic stroke was almost five time higher than the one for patients with ischemic stroke. After being hospitalized in ICU, the number of patients with haemorrhagic stroke decreased to almost half compared to the number of patients with ischemic stroke. Thus, patients with ischemic stroke needed a longer hospitalisation time.

We also correlated the lenght of ICU stay related to patients` gender (Figure 2). Even if there were more men admitted with acute stroke in the ICU, the lenght of hospital stay and the mortality rate were higher in women.

Thus, the mean hospitalisation time for women was 13.16±29.72 days (with limits between 1 and 330 days) and the mean hospitalisation time for men was 10.06±12.99 days (with limits between 1 and 105 days).

The analisys of the necesity of mechanical ventilation revealed the following (Figure 3):

a) For the ischemic stroke group: 20% (22 patients) needed less than 24 hours of mechanical ventilation and 72% (16 patients) died in the first day. Another 20% (22 patients) needed between 24 and 95 hours of ventilatory support and 59% (13 patients) passed away during this hours. 40% (43 patients) needed more than 96 hours of mechanical ventilation and the mortality rate was 88% (38 patients) from the group. Finally, 20% (19 patients) from the group didn`t need any ventilatory support and the mortality rate was 68%.

b) For the haemorrhagic stroke group, 32% of the patients (160 patients) needed less than 24 hours of mechanical ventilation and 21% (34 patients) from the group died in the first day. Another 16% (80 patients) needed between 24 and 95 hours of ventilatory support and 78% (63 patients) passed away during this period of time. 36% (179 patients) needed more than 96 hours of mechanical ventilation and the mortality rate was 78% (140 patients) from the group. Finally, 14% (70 patients) from the group didn`t need any ventilatory support, with still a high mortality rate of 44%.

Regarding the comorbidities, the highest risk factor for the ischemic stroke group was hypertension (28%), followed by heart disease (24%), lung disease (14%), diabetes mellitus (11%) and kidney disease (8%). In the haemorrhagic stroke group, the highest risk factor was the heart disease (37%), followed by high blood pressure (29%), diabetes mellitus (5%) and obesity, lung and renal disease (4% for each). 15% from the group had no comorbidities at the admission time compared with the ischemic stroke group of 7% ($p < 0.001$) (Figure 4).

Table 1. *Demographic and clinical characteristics of the studied population*

Characteristics	**Ischemic Stroke (n = 104)**	**Haemorrhagic Stroke (n = 491)**
Male gender	64 (61 %)	238 (48 %)
Deceased	78 (75 %)	270 (54%)
Duration of endotracheal intubation		
0-23 h	22 (21%)	160 (33%)
24-95 h	22 (21%)	80 (16%)
>96 h	43 (41%)	181 (37%)
no MV	17 (17%)	70 (14%)
Comorbidities		
Hypertension	71 (28%)	291 (29%)
Heart disease	61 (24%)	372 (37%)
Lung disease	35 (14%)	42 (4%)
Kidney disease	20 (8%)	39 (4%)
Liver disease	8 (3%)	24 (2%)
Diabetes	27 (11%)	45 (5%)
Obesity	13 (5%)	37 (4%)
No comorbidities	18 (7%)	146 (15%)

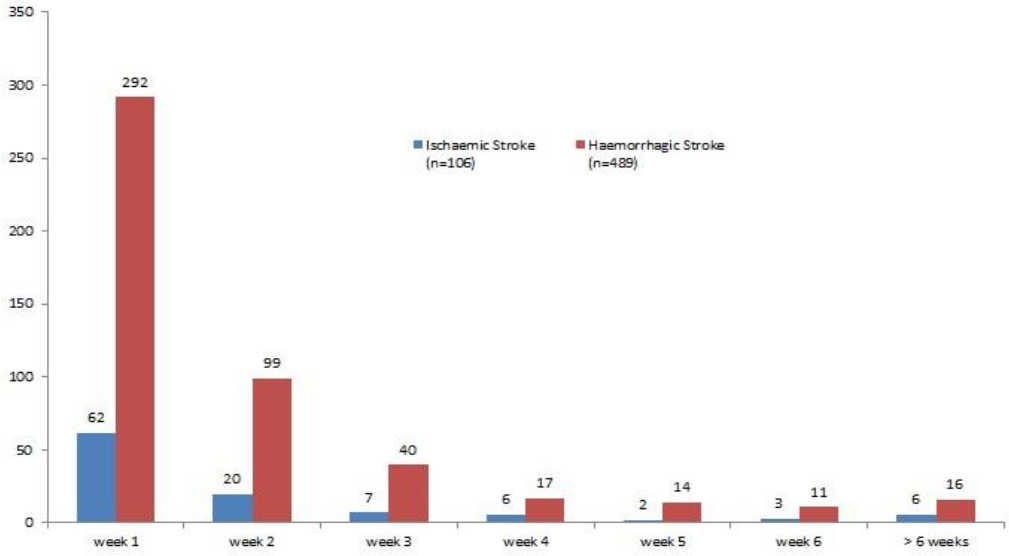

Figure 1. Lenght of ICU stay in correlation with stroke type

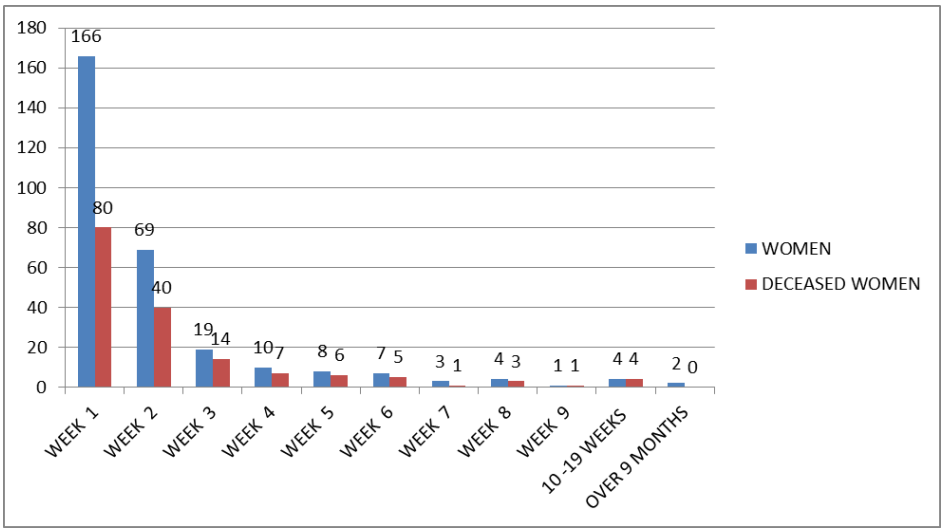

Figure 2a. Mortality correlated with patients` gender and non-dependent by stroke type

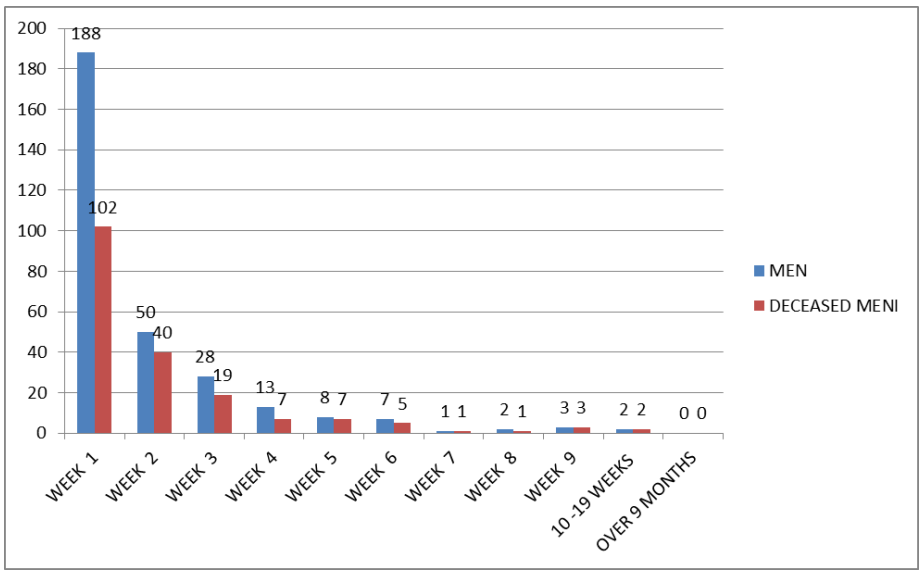

Figure 2b. Mortality correlated with patients` gender and non-dependent by stroke type

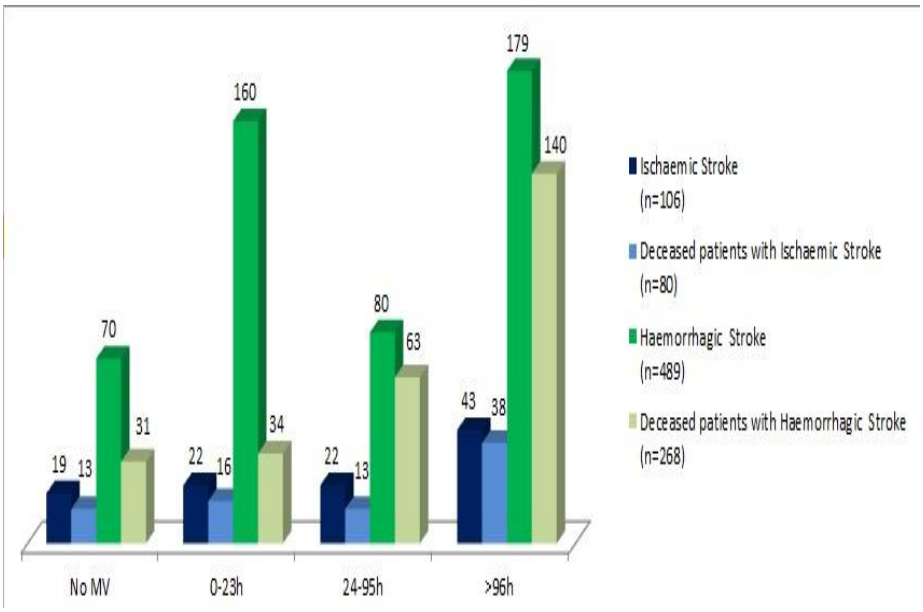

Figure 3. Mortality related to stroke type and lenght of mechanical ventilation

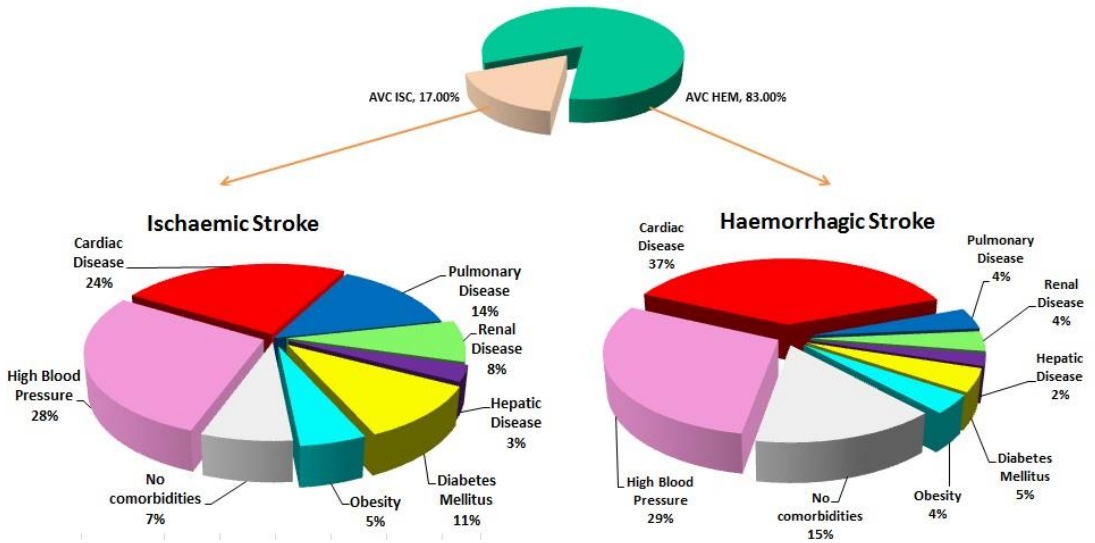

Figure 4. Incidence of comorbidities in patients with acute stroke, ischemic and haemorrhagic

DISCUSSIONS

Accurate information about hospital resources utilization is necessary for the management of health care services. The analysis of prolonged length of ICU stay can provide valuable data for planning and policy in the health care system. The average length of stay for the acute stroke patients varies among different countries. That may reflect the impact of the differences in organizing the health care systems worldwide. The length of stay in USA for an acute ischemic stroke ranges from 6 to 11 days [5] compared with a much longer hospitalization time (17 to 26 days) in Canada [9], Europe [6] and Asia [10].

In the present study, the mean length of ICU stay for the patients with acute stroke was 11.58± 23.18 days (limits between 1 and 330 days). Divided by gender, the mean lenght of ICU stay for women was 13.16 ±29.72 days (with limits between 1 and 330 days) and 10.06±12.99 days for men (with limits between 1 and 105 days).

In our study the haemorrhagic stroke had almost five time higher incidence than the ischemic stroke.

Though the diagnosis and care of stroke patients have been improved, the mortality resultant from stroke remained significant, with 50% in some clinical studies [11]. In a sample of 467 patients, only 13% died within 30 days of their first-ever stroke [12].

In our study, the global mortality rate was 60%.

The highest incidence regarding the type of stroke was the subarrachnoid haemorrhage (75%), followed by the ischemic stroke in the left hemisphere (10%). On the opposite side, the statistics of the American Heart Association showed that ischemic stroke accounts for 87% of all stroke cases [13].

The mean age for the ischemic group was higher in our analisys, 65.32±10.69 years old versus 57.58±4.85 years old for the haemorrhagic group ($p < 0.001$). Similar results were found in a study from Nanjing Medical University, China: the mean age was 68.37±10.59 years for the ischemic stroke group, which was significantly higher than that of the hemorrhagic stroke group 62.16±12.59 years [14].

Male gender was another independent predictor of prolonged hospital stay. Cohort studies indicated that women and men have differences in risk factors profiles, acute stroke presentation and stroke etiology [22] but clinical outcome as well as the number of patients with a favorable clinical outcome did not differ significantly between women and men [23]. Male gender was also a predictive factor of prolonged hospitalization in the study of Chang et al. [10]. It is not clear whether the influence of gender on the length of hospital stay reflects the impact of culture difference or might be due to other factors.

In the present study, the mean hospitalisation time in the Intensive Care Unit was longer for women (13 days) than for men (10 days). The present study revealed that in the haemorrhagic stroke group, male gender had a higher mortality rate compared with females. In the ischemic stroke group, the mortality rate was higher for women.

Other clinical predictors related to the severity of stroke, such as the hours of mechanical ventilation were compared to patients´ gender. There was an increased number of women who needed ventilatory support in the first 24 hours; after 24 hours over 50% of the patients mechanically ventilated were men. We didn`t find any results in the literature regarding this topic.

Related to the period of mechanical ventilation, the mortality rate was 72% for ventilation time shorter than 23 hours in the ischemic stroke group and 21% in the haemorrhagic stroke group; the mortality rate was 59% for ventilation

time between 24 and 95 hours in the ischemic stroke group and 78% in the haemorrhagic stroke group; the mortality rate was 88% for ventilation time longer than 96 hours in the ischemic stroke group and 77% in the haemorrhagic stroke group. However, the prognosis of stroke patients mechanically ventilated was poor, with mortality rates of 49% to 93% reported by several studies [15,16,17,18]. In a study, Mayer et al. searched the outcome of mechanically ventilated patients with stroke and the results showed a mortality of 50% (10/20) in cerebral infarction patients, 71% (17/24) in intracerebral haemorrhage patients and 88% (7/8) in subarrachnoid haemorrhage patients ($p = 0.13$) [19].

The goals of positive-pressure ventilation in brain-injured patients were primarily aimed to improve oxygenation and control the arterial CO2 tension, to minimise the intracranial hypertension [20]. Accurate prediction for surviving among stroke patients who required mechanical ventilation is important.

In a multivariable analysis, a GCS score of 5 (present at 20% of patients) and neurological deterioration after intubation (present at 40% of patients) were predictors of 30-day mortality ($p < 0.0001$) [19]. Mechanical ventilation should be considered as an additional measure to control the intracranial hypertension at patients with severe stroke.

Our study showed that most ventilated patients with stroke had a high mortality rate in the first 14 days after admission.

The present study revealed that mortality in stroke depended on several preexisting risk factors. The relevance of medical comorbidities in acute stroke victims was also an important clue of this study.

This study focused on seven comorbidities (hypertension, other cardiac diseases, lung diseases, kidney diseases, liver diseases, diabetes mellitus, obesity). Hypertension looked to be the first factor involved in the etiology of the ischemic stroke group (28%) and the cardiac disease was the first factor involved in the etiology of the haemorrhagic stroke group (37%). Also, hypertension was present in more than one-third of participants in a prospective cohort study of 14,357 participants with stroke [22].

There were more patients (15%) with no comorbidities in the haemorrhagic stroke group that in the ischemic stroke group (7%) ($p < 0.001$).

Our study's strength was its large sample size allowing for sufficient statistical power. Secondly, we included patients with large limitations of age (25-80 years). All the patients underwent a standardized risk factor evaluation. Finally, we had the survival data regarding all the patients included in the study.

The weaknesses of our study were the absence of the informations regarding the treatments or interventions that might have influenced the survival rate, but we considered it unlikely that such an information would have changed the conclusions of this study. The limitation of our study was the imposibility to estimate the true cost of hospital and posthospital care of our patients.

CONCLUSIONS

The present study revealed that the admission rate was almost five time higher in the haemorrhagic stroke group. The mortality rate was higher in the ischemic stroke group. For the ischemic stroke group mortality rate was higher at women comparing with a higher mortality at men in the haemorrhagic stroke group. Thus, patients` gender could not be

considered a relevant factor involved in the evolution of the acute stroke. Patients admitted with haemorrhagic stroke were younger compared to those with ischemic stroke. Hospitalisation time in ICU was longer for the haemorrhagic stroke group, respectively for women. There were more patients needing ventilatory support for more than 96 hours in the ischemic stroke group; in the haemorrhagic stroke group more patients needed ventilatory support for less than 24 hours or more than 96 hours. High blood pressure played a very important role in the etiology of the ischemic stroke and the cardiac diseases were the first leading cause in the etiology of haemorrhagic stroke.

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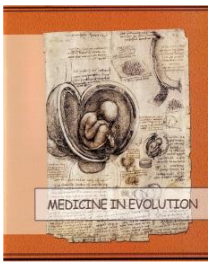
CLINICAL-BIOLOGICAL CONSIDERATIONS IN THE MONONUCLEOSIS SYNDROME



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ABSTRACT

Introduction: the mononucleosis syndrome (MNS), by its clinical and cytohematological composition, orientates the diagnosis towards one of the following aetiologies: Epstein-Barr virus infection (EBV), cytomegalic, HIV, toxoplasmosis, varicella-zoster virus, measles virus, medullary regenerations after aplasia or toxic agranulocytosis, after blood transfusions or organ grafts.

MNS associated with EBV primo-infection is at the top of the list.

Material and method: the work contains a retrospective cross-observational study, performed on 169 patients admitted to Clinic II of Infectious Diseases and Pneumophtisiology Hospital "Victor Babeş" Timişoara, diagnosed with mononucleosis syndrome, between January 2013-December 2014.

Results and discussions: the aetiological structure of the analysed group led to the placement of infectious mononucleosis on the first position. There has been an outline of the emergence of symptomatic primo-infection in pre-school children and pupils. Anamnestically, the presence of similar infections in the family could not be pointed out.

Conclusions: the relatively high number of infections registered within the last year is due to the efficency growth of the diagnosing action. We cannot prove, though we can accept, that the real incidence of the disease remains undervalued, because clinical benign boards, atypical or asymptomatic, lose their identity under other framings.

Key words: *mononucleosis, Epstein-Barr, primo-infection*

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INTRODUCTION

The mononucleosis syndrome (MNS), by its clinical and cytohematological composition, orientates the diagnosis towards one of the following aetiologies: Epstein-Barr virus infection (EBV), cytomegalic virus (CMV), HIV infection, toxoplasmosis, varicella-zoster virus, measles virus, medullary regenerations after aplasia/toxic agranulocytosis, after blood transfusions or organ grafts.

MNS associated with EBV primo-infection occupies the first place (70-80%). In defining the clinical framework of the disease, the names under which the disease has been known along the years are of great help: "idiopathic ganglion inflammation" (1885, Filatov), "glandular fever" (1889, Pfeiffer), "monocytic angina" (1920, Schultz), "infectious mononucleosis" (1922, Sprunt and Evans); in 1932, Paul and Bunnel add a serological proof in defining these clinical boards (the presence of heterophile antibodies); in 1964, Epstein and Barr iosolate the virus involved in the breakout of the disease. Thus, after 79 years, the disease has rediscovered its true identity.

A similar timeline can be noticed at the cytomegalic disease. In 1881 there is the first description of the cytomegalic cytopathic effect, in 1921 happens the framing of "cytomegaly", in 1952 the first intra vitam diagnosis is made by highlighting the cytomegalic inclusion cells in the cytologic analysis of a urinary sediment. In 1995 the isolation and spreading of the causal factor of "cytomegalic inclusion diseases" has been attained; in 1971, once the immunoenzymatic diagnosis was tuned, a new way of diagnosis harnessing appeared, based on the sero-immunologic exam.

Given the auto-limitation and the benign character of the primo-infection, the immune response of the host does not perform the desired viral clearance, the infection latently biding, with the possibility of reactivation in the presence of multiple favourable factors.

MATERIAL AND METHODS

In a retrospective cross-observational study, performed on 169 patients admitted with the diagnosis of MNS in Clinic II of Infectious Diseases and Pneumophtisiology Hospital "Victor Babeş" Timişoara, diagnosed with mononucleosis syndrome, between January 2013-December 2014, the authors have aimed to research the following aspects: the aetiological structure of MNS, age groups distribution, subjective and objective symptomatology, cytohematologic syndrome's peculiarities, presence/absence of hepatic cytolysis, of the inflammatory syndrome, the evaluation of intra-infectious hepatitis incidence, the share of various biological and paraclinical investigations in identifying the aetiologic diagnosis, the tests used as regards the specific humoral immune response. The observational character of the study included both the descriptive and the analytical sides of the analysed phenomena.

Results: in the descriptive part of the work there are presented a few variables with general character: age, sex, background.

Patients included in the study were of age between 4 months and 32 year olds, with an average of 18 years. The gender distribution showed a high incidence at male subjects (59% - 101 patients).

The source of pathogenic agents (EBV and CMV) being exclusively human (no intermediary hosts), supports a relative equality between

the two environments (rural and urban);the asymmetry appears as secondary, after precarious socio-economical conditions (valid for both environments) and a continuous human interaction specific for the urban area. The distribution in rural-urban environment admits in our study a higher incidence in the urban area (65% - 111 patients).

The period of time between the symptomatology's debut and one's incoming to the doctor illustrates, on the one hand, a proper clinical expression of the disease and shows, on the other hand, a good adressability, especially as regards the small group of age – fig. 1.

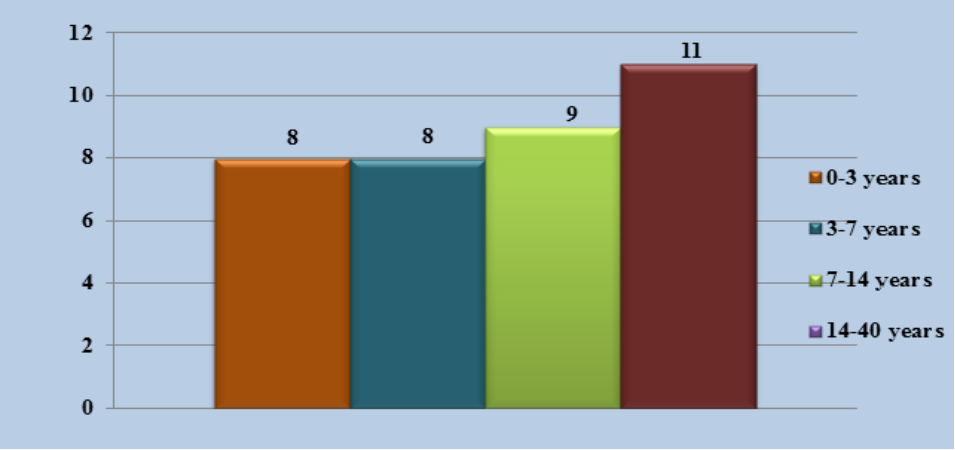

Figure 1. Time interval between the sympotomatology's debut and the presentation at the doctor

Antibiotic medication administered at the patient's home shows a general tendency of assimilating fever as a manifestation of the infection and of resorting to antibiotics without a minimal bacteriological investigation and aside from an argument based on statistical criteria of probability, 48% of the patients being administered at least one antibiotic by the entry in our clinic.

The first diagnosis formulations come to highlight the "pathomorphosis" process that the infectious pathology undergoes: the framing based on the clinical exam's date was that of fever syndrome, adenomegalia or eruptive syndrome – fig. 2.

The classic symptomatologic triad from the debut (fever, angina, adenopathy) has been replaced by monosyndromic and atypical forms – fig. 3.

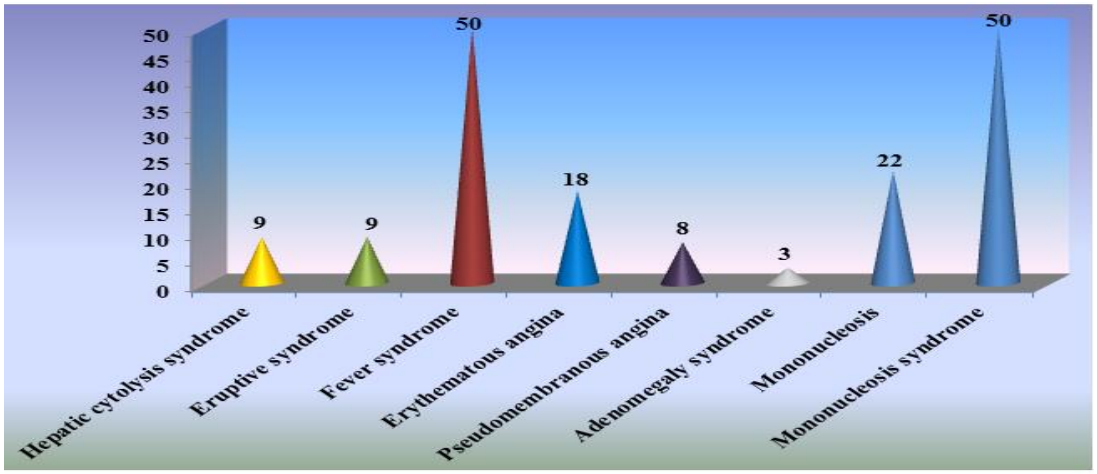

Figure 2. Syndromic diagnosis, "borrowed"

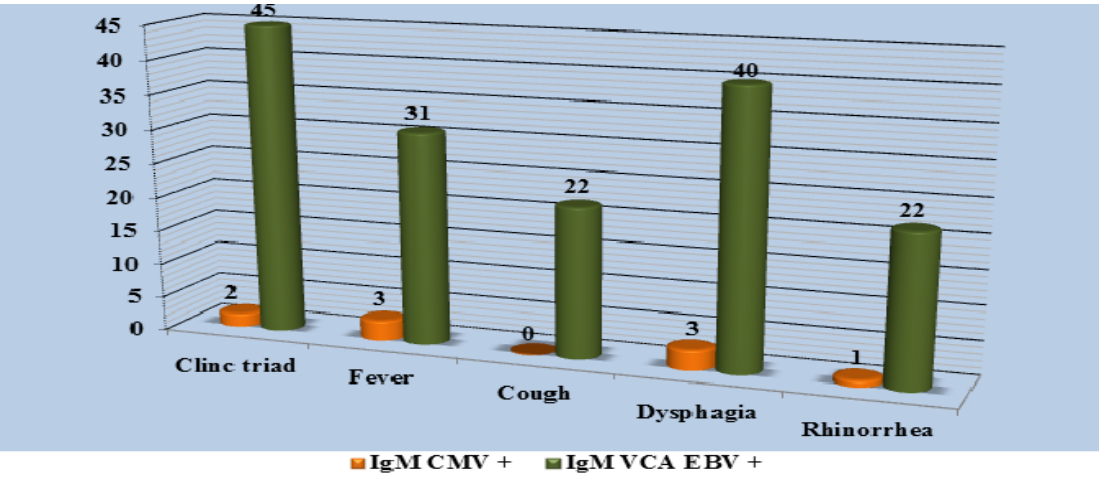

Figure 3. Debut symptomatology

The objective clinical exam will also regard the research of other clinical aspects under which the disease might emerge, besides the analysis of the distinctive symptomatic triad – fig. 4.

In the analysed group, the classic aetiologic triad, represented by EBV, CMV, toxoplasmosis stands, with the placement of infectious mononucleosis on the first position – fig. 5.

The EBV infection presents a morbidity peak in the 0-7 year olds group (77 cases), a second peak in the 14-40 year olds group (61 cases). The CMV is better expressed in the 0-3 year olds group (10 cases), the other 9 cases are among the next 3 groups of age (3-7 year olds, 7-14 year olds). Toxoplasmosis (a total of 12 cases) belongs to the 3-40 year olds group – fig. 6.

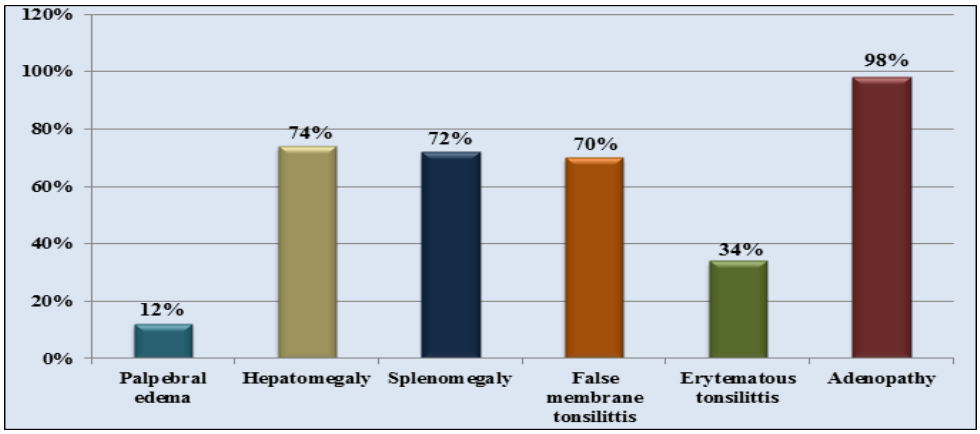

Figure 4. Signs

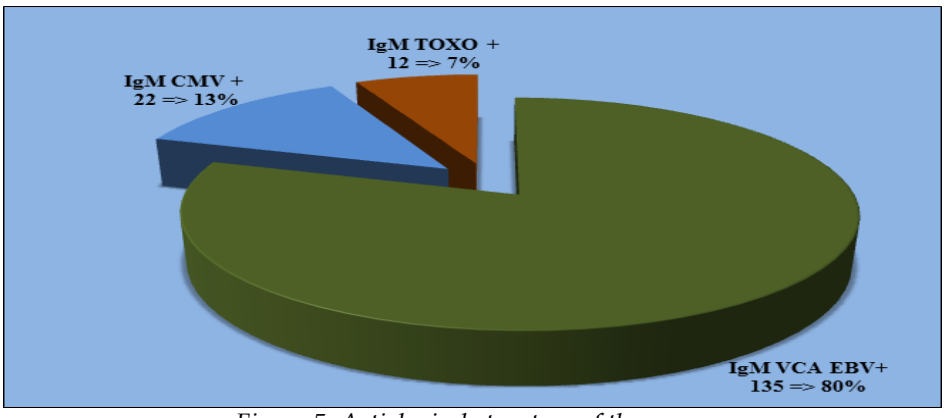

Figure 5. Aetiological structure of the group

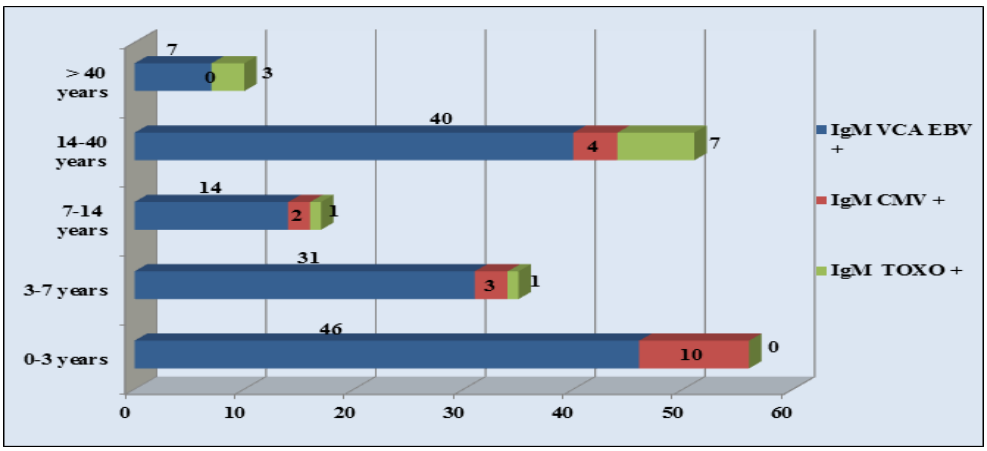

Figure 6. Aetiological structure on groups of age

The hepatic participation, clinically expressed through hepatomegaly and cytobiologically through cytolisis, concerned the age group of 0-3 year olds in all the three aetiologies (42% EBV, 26% CMV, 8% toxoplasmosis) – fig. 7.

The nonspecific inflammation syndrome: was present at moderately high values, in 44% of the EBV patients and in 34% of the CMV patients.

Duration of hospitalization varied between 4-7 days; it was larger at patients with higher cytolisis. The discharge was determined by the favourable evolution of the clinical-biological board – fig.8.

From the analysis of monthly incidence during the epidemy's evolution results that the highest value has been registered in October, 9 times higher than the one in September – fig. 9, 10.

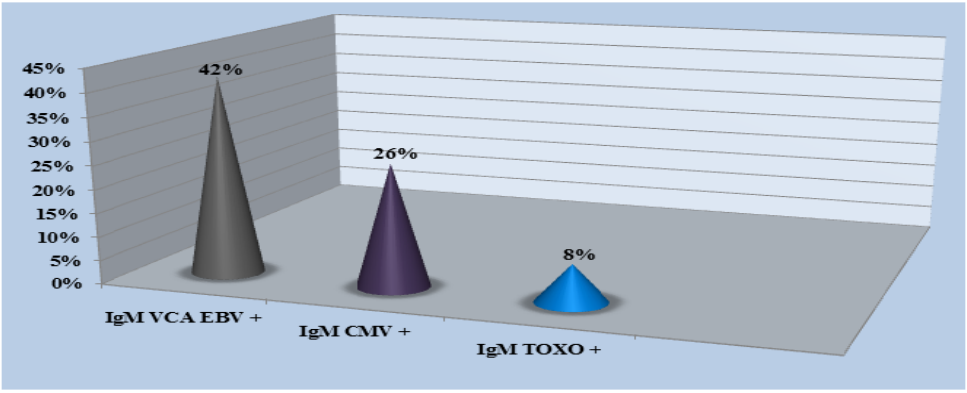

Figure 7. Intrainfectious hepatitis

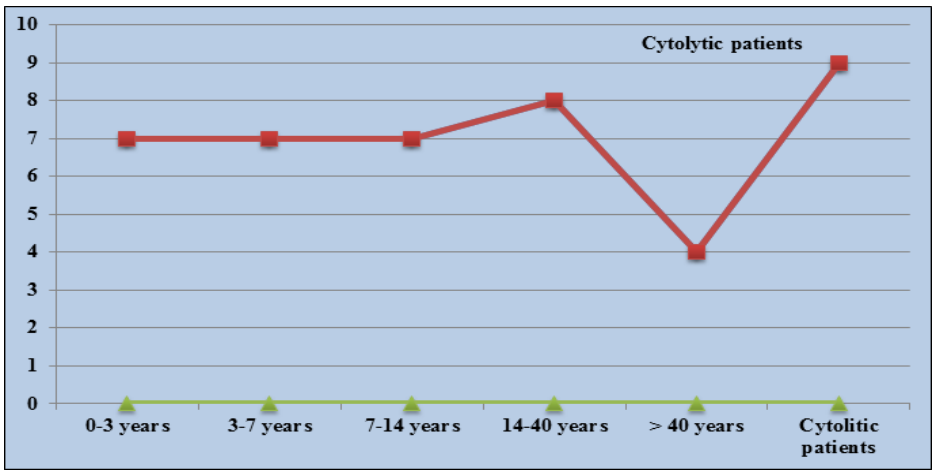

Figure 8. Duration of hospitalization

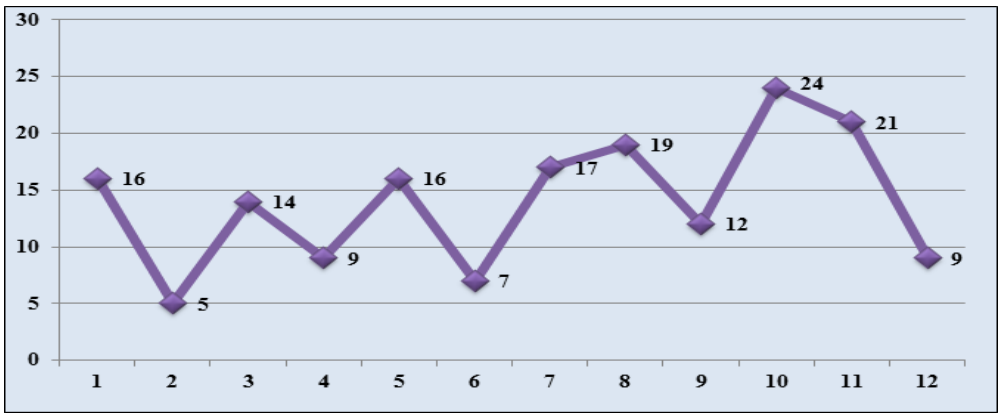

Figure 9. Monthly incidence of mononucleosic syndrome

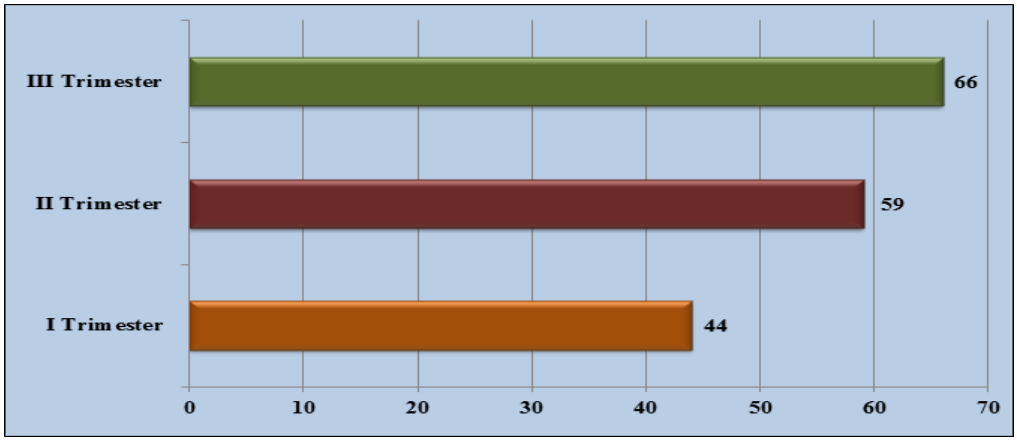

Figure 10. Semester incidence of mononucleosic syndrome

DISCUSSIONS

The data extracted from the researched clinical casuistry is being presented from the perspective of the practitionar doctor, the one who has to establish a diagnosis, to identify an aetiology, to prescribe a particular targeted treatment, to supervise the clinical evolution and to draw up a balance sheet at the end of the performed study.

Without being able to relate to a sero-epidemiological investigation in our area, from the data available in specialty literature results that aproximately 50-70% of the investigated population sample feature seroconversion by the age of 5. If precarious social and economical conditions place primo-infection within the age group 1-4 year olds, in higher economical standard classes primo-infection affects especially teenagers (13-19 year olds) and young adults. We acknowledge, as guidance, the data of a sero-epidemiological study performed in France, on subjects aged 0-20, who necessitated admission for various reasons. The conclusions of the study have shown that anti-VCA antibodies' prevalence has constantly increased with the age, going from 12% at 5-12 month olds to 73% at 10-20 year olds and 95% in adults.

In our patients, reporting the specific age-group antibodies' presence led to the registering of two morbidity apexes: one in the age group of 3-7, the second in the age group of 14-40.

Though the receptivity to EBV infection is general and equal in both genders, CMV infection is more frequent in women. The recent, recurrent or latent CMV infections ratio varies depending on age, immune status and the physiological condition of the organism. Pregnancy, due to the profile of hormonal changes and to the peculiarities of the immune system,

increases the receptivity towards the CMV infection, especially in young primiparae. CMV primo-infection in pregnancy is accompanied by repeated viremia, which implies a great risk of infection of the fetus, estimated at 40-50% in the first trimester, 8-25% in the second trimester, 0-7% in the third trimester. In our study, prevalence was higher in men.

In the diagnosis phase, the attention was orientated towards knowing the debut symptomatology, the home treatment to be followed, the length of this period (hours or days). Anamnestically, patients admitted into the trial could not be classified as coming from a family-related or a community focal point.

In the beginning, clinical evolution and objective exam data allowed us only a syndromic classification (fever, angina, adenomegalic syndromes); a brief biological exam, through the presence of a cytohematologic board of lymphoma monocytosis, limited the framework of the aetiologic diagnosis; stand at the forefront the EBV, CMV infections and toxoplasmosis.

In our casuistry, the EBV infection registered, alongside the presence of the classic symptomatic triad, monosyndromic debuts or atypical forms.

If in the past the invasion stage (3-5 days) and the period of stagnation (7-14 days) were marked by the emergence of the specific symptomatic triad - erythematous pultaceous or pseudomembranous angina, adenomegaly (without suppuration or periadenitis), fever (continuous, biphase or irregular) -, currently the clinical board is more proteiform, fever outstands as a dominant symptom, and, in completing the clinical board, angina, adeno-splenomegaly, cough and catarrhal inflammation add up. The presence of the eruptive syndrome, anamnestically simultaneous with an antibiotics treatment, especially ampicillin, becomes a suggestive element in the diagnosis. The eruption, as a part of the clinical board, owns 14% and in an ampicillin treatment it can reach 90% (it becomes a pathognomonic association). The exanthem, associated or not with previous administration of antibiotics, has been recorded in 8% of the patients.

CMV infection, though particular due to the presence of a symptomatology common in respiratory virosis (cough, nasal catarrh, fever, myalgia), has kept the "hematological signature" of the disease. As regards the clinically dominant symptomatology we recall the isolated fever debut (70% of the cases) and a faded objective symptomatology, as a part of the classic clinical triad, with the following complaints in the age group of 0-3: cough (24%), rhinorrhea (34%), adenopathy (47%).

The objective examination can point out, at the junction of the soft and the hard palate, a few maculopapular or petechial elements, accepted as valuable signs for precocious diagnosis of MI. Without being frequent, we have signaled, in out patients, the presence of an extended palpebral edema, ocular catarrh and an emphasized hypertrophy of the angulomandibular and occipital ganglions, of an extended paraganglionar edema, to the extent of causing the so called "proconsular throat".

The harming of the liver, as a part of the primo-infection's manifestations under which MI can evolve, has been noticed in 44 patients; hepatocytolisis's values have normalized within 20-30 days after the discharge (post-discharge check). Mononucleosic hepatitis with jaundice emerges only in 5-10% of the patients and usually follows a favourable evolution. In literature are also registered cases of MI hepatic coma. CMV hepatitis frequently evolves subclinically and is followed by full recovery.

Thus, the relatively high frequency of intra-infectious hepatitis pinpoints the necessity of performing MNS specific serologies.

In this work, the nonspecific inflammation syndrome has been evaluated by determining the VSH and CRP. The speed of the CRP's response to acute phase stimuli, joined with its large field of serum concentration and the measuring ease assured it an important part in monitoring the rigor and evolution of the infectious process. In aproximately 50% of our patients moderately high values have been registered (<30mg/l).

The immuno-serologic diagnosis, by the researched parameters, was going to establish the presence/absence of the EBV/CMV infection and the stage of the infection: primo-infection, reactivation, latent infection. By missing an anterior serologic determination upon which to detect a seroconversion of IgM anti-VCA and anti-EA antibodies, the diagnosis was based on the significantly high values of specific IgM titre (therefore eliminating the necessity for proof of their dinamic growth for confirming the diagnosis). The lymphoma monocytosis cytohematological board, as part of the immune celullar response, represents that variable percentage of "activated" T lymphocytes which, submitted to a more intense proliferation process, emerge under morphological and tinctorial aspects as monocytoid, plasmocytoid or lymphocytoid lymphocytes. The lymphocytosis cytohematologic board, although suggestive for EBV and CMV (due to frequency) can be found in other viral infections (HIV, measles, adenoviruses), protozoan infections (toxoplasmosis), bacterial infections (Listeriosis, secondary lues, Rickettsiosis), other diseases (medulla regenerations after agranulocytosis, toxic medullar aplasia).

In the situation of a full integrity of the immune system, the EBV infection, through a neutralizing mechanism, can give resistance against a new infection, but it cannot prevent neither the settling of viral persistency, nor the possibility of an endogenetic reactivation. On immuno-compromised field, the same infection can induce malignant lymphoproliferative, salivary glands carcinoma, epithelial cells.

The question whether EBV is an oncogenic agent or not is justified by the following:

- EBV antibodies are present in high titres in patients with different tumors: Burkitt lymphoma (BL), nasofaring cancer (NFC), Hodgkin disease;
- Viral EBV genome has been highlighted in BL and NFC cells;

I. EBV has the quality of determining aggregated lymphoblastoid cells in lymphocite B which, by continuously multiplying, give birth to immortalized cell lines.

Non-implication of EBV in oncology is supported by:

- Sero-immunological research proves that 80-100% of the population of different globe areas overcomes EBV infection, whereas BL is limited to a few geographic areas;
- In vitro, EBV is mutagenic, but not oncogenic;

The ordinary formula of the disease is autolimitative, healing in 2-3 weeks. In our patients, the dynamic of the clinical complaints has been in a visible remission within a short amount of time, which did not require but a 4-6 days of hospitalization.

The data resulting from the clinical evolution and biological profile of the EBV primo-infection would be more convincing if it were completed by a post-primo-infection supervision over a long period of time – this is given a lot of importance.

CONCLUSIONS

The analysis of the data resulting from the evolution of the epidemic micro-focal point allows drawing the following observations:

- The specific symptomatic triad can be found, at the moment, especially in a monosyndromic form;
- The stage of the cytohematologic exam;
- In MI, at the same time with the clinical healing there is not a viral clearance, the infection remains latent and can be reactivated in the eventuality of primary/secondary immune defficiency;
- In the relation virus – host cell, EBV turns out to be epithelio- and lymphotropic in vivo, but only lymphotropic in vitro; in glandular epithelial cells (parotid, salivary glands), the infection is lytic, replicative-productive and in lymphocyte B the viral genome persists in circularized form, as episome, and the persistency is related to its entrance in the cellular cycle of multiplication of the host lymphocyte.

To the question about the possibility of the EBV being an oncogenic agent, the current data lead to the affirmation that BL and NFC do not represent more than a clinical moment induced by the immunodeficiency condition or by chromosomal translocations.

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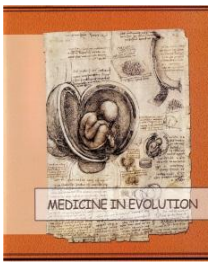
FREQUENCY OF FRUIT CONSUMPTION IN RELATION WITH THE WISH OF GAINING THE OPTIMUM WEIGHT IN ADOLESCENTS



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ABSTRACT

The purpose of our research was to evaluate some aspects of fruit consumption by teenagers from Timisoara, Romania. The work group included 243 students: 37.9% gymnasium pupils and 62.1% high school pupils; 56.4% of them were girls whereas 43.6% were boys; their ages were between 11 and 18 years. The working method was the cross-population study, as a case study. The results indicate that 65.6% of the gymnasium pupils and 47.5% of the high-school pupils eat fresh fruit daily. The number of girls aged 15 to 18 years that consume fresh fruit is significantly higher than the number of boys who do so. Daily consumption of juice prepared from fresh fruit is indicated by 25.6% of the pupils aged between 11 and 14 years and by 18.6% of the pupils aged 15 to 18 years. Gender and age group are the factors that contribute significantly to the decision to eat fresh fruit on a daily basis in connection with the desire to lose weight or to maintain it. The number of girls that eat fresh fruit on a daily basis is 2.11 times higher than the number of boys who do so, whereas the number of pupils aged between 11 and 14 years that consume fruit on a daily basis 2.19 times higher than the number of high school pupils who do so.

Key words: *teenagers, fruit consumption*

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INTRODUCTION

A report of WHO/FAO [1] experts regarding diet, nutrition and chronic disease prevention has established the nutrients necessary to population. It is recommended to consume minimum 400 g of fruit and vegetable per day in order to prevent chronic diseases such as cardio-vascular diseases, cancer, diabetes and obesity. The report highlights that there is solid evidence that the consumption of fruit and vegetable reduces the risk of obesity, CVD and that it probably reduces the risk of diabetes mellitus.

Approximately 16.0 million DALY (1.0%) and 1.7 million (2.8%) of the deaths in the world can be associated with low consumption of fruit and vegetable. An adequate consumption of fruit and vegetable reduces the risk of cardio-vascular diseases, stomach cancer and colorectal cancer. There is evidence that low consumption of high energy density foods, processed foods, foods rich in fat and sugar promote obesity, in contrast with low energy foods consumption, such as fruit and vegetable [1].

A recent review [2] that investigated the link between consumption of fruit and vegetable and adiposity in adults and children revealed that in the case of adults there is a reverse relationship in the case of seven longitudinal studies, while in 3 of the studies the expected relationship between consumption and adiposity was relevant only for vegetable and only in the case of women. As for children, only 1 out of 4 longitudinal studies were able to demonstrate such a reverse relationship. It has been discovered that the reverse relationship between the quantity of fruit and vegetable and adiposity, in both experimental interventions and longitudinal studies, was only obtained in the case of overweight adults and children. It is argued that people with a higher initial weight were more motivated to lose weight. Alternatively, the heavier weight would have allowed more space for change and therefore diet changes could have had a greater impact on participants with heavier weights.

With regards to obesity, the consumption of fruit and vegetable cannot be considered as a remedy [3]. Advising people to increase consumption and replace high-energy content snacks and soft drinks with fruit and vegetable can help in maintaining the energy balance. As an argument in favour of the interventions that promote fruit and vegetable consumption, we may use the finding that, due to the high fibre content, they promote a greater state of satiety, thus reducing the calorie intake. By promoting the consumption of fruit and vegetable it is aimed to replace snacks and soft drinks which are so popular among children and teenagers.

Our aim was to perform a study related to aspects of fruit consumption by teenagers from Timisoara, Romania.

MATERIAL AND METHODS

Material

The study group included 243 pupils from a high school in Timisoara: 37.9% were in gymnasium classes and 62.1% in high school classes; 56.4% of them were girls and 43.6% were boys and both groups had a homogenous distribution of genders, p=0,248; their ages was between 11 and 18 years with an average age of 15.04 years and a standard deviation of 2.124.

Method

The working method was the cross-sectional study of people, as a case study, based on the CORT 2004 questionnaire regarding health risk

behaviours in adolescents and young people. The questionnaire was validated by the Ethics Committee of the "Victor Babes" University of Medicine and Pharmacy Timisoara.

The study was conducted with written approval of the university. The pupils were included in the study only after the freely expressed consent of each participant of the study while also observing their individual rights.

Data processing and interpretation uses modern methods of advanced medical statistics with the aid of the PASW 18 (SPSS 18) 2010 software. The statistical significance p value was set at $p<0.05$, except for the situations where the Bonferroni correction was applied – in these cases the accepted p value was specified in the text. To compare ordinal data, we have used the Mann-Whitney and Kruskal-Wallis tests. The chi square test was used for ordinal/nominal data. The logarithmic regression test was used as well.

RESULTS

1. Fresh fruit consumption frequency

In the case of high school pupils, the highest frequency of fresh fruit consumption is of at least 2 times/day, 36.7%, the cases of boys are slightly more numerous than cases of girls, i.e. 18.9% and 17.8% respectively. On the second place is the daily fruit consumption, in the case of 28.9% of the participants, i.e. 18.9% of the girls and 10% of the boys.

High school pupils indicated a consumption of 1 to 3 times/week - 29% of the participants, that is 15.2% of the boys and 13.8% of the girls, followed by the 2 times/day consumption indicated by 24.1% of the participants and 1 time/day by 23.4% of the participants, the frequency being higher in the case of girls, i.e. 12.7 per cent, and 9.7 per cent of the boys respectively.

Only one pupil from each of the two education cycles did not consume any fruit.

No differences between genders was identified in relation with the frequency of fruit consumption in the case of the age group between 11 and 14 years, p=0,511. In the case of the age group 15 to 18 years, girls consume fresh fruit significantly more frequently than boys, U=1892, z=-2.68, p=0.007. No difference in the frequencies of fresh fruit consumption was identified between the 2 age groups, not even in the case of girls (p=0.153). As for boys aged 15 to 18 years, they consume significantly more rarely fresh fruit as compared to the 11 to 14 years old group, U=929.5, z=2.38 p=0.017.

2. Fresh fruit juice consumption frequency

As for fresh fruit juice consumption, poor in fibres as compared to fresh fruit, most pupils have declared a consumption of 1-3 times a week in the case of 37.8% of gymnasium pupils and 42.8% of the high school pupils. Girls consume fresh fruit juice more frequently than boys, i.e. 1 to 3 times/week, as follows: 20% and 17.8% respectively for the 11 to 14 years group; 26.2% and 16.6% for the 15 to 18 years group.

Daily consumption is indicated by 15.6% of gymnasium pupils and 8.3% of high school pupils. Girls consume fruit juice more often than boys: 8.9% as compared to 6.7% for the 11-14 years group; 6.2% as compared to 2.1% for the 15-18 years group. A consumption of at least 2 times/day is present in the case of 10% of the pupils aged 11 to 14 years and in the case of 10.3% of those aged between 15 and 18 years, boys make the majority for both education cycles.

For the age group of 11 to 14 years no differences between genders were identified in terms of frequency of consumption of fresh fruit juice,

p=0.487. In the case of the age group 15 to 18 years we have not found any differences between genders related to the frequency of consumption of fresh fruit juice, p=0.517. Moreover, no difference in the frequency of consumption of fresh fruit juice was identified between the two age groups, neither in the case of girls (p=0.068), nor in the case of boys (p=0,802).

3. Determinant factors of the decision to consume fresh fruit daily in connection with the desire to lose weight or to maintain it (Table 1)

We have applied logistic regression in order to demonstrate the influence of gender, age group, BMI and the desre to lose weight on the decision to consume fruit dailyand we have found that the model that includes these four predictors is statistically significant χ^2=15.00, p=0.005, this indicating the fact that the model can distinguish between the respondents which have eaten fruit daily and those who have not done so. The model explains between 6.3% and 8.4% of the variation of the decision to eat fresh fruit daily and classifies correctly 63.0% of the cases.

Only to independent variables contribute significantly to the model, namely gender and age group. Feminin gender has an OR (odds ratio) of 2.11, as the cases of girls consume fresh fruit on a daily basis are 2.11 times more frequent than the cases of boys, while the other factors of the model remain constant. The age group of 11 to 14 years has an OR of 2.19, as the cases children in gymnasium consume fresh fruit daily are 2.19 more frequent than the number of pupils in high school that do so. The BMI value (p=0.914) and the desire to lose weight (p=0.595) does not contribute to the decision to eat fresh fruit daily.

Table 1. *Factors included in the prediction model of the decision to consume fresh fruit daily for the purpose of losing weight or maintaining it*

	B	SE	p	OR	95% of IC for OR	
					Inferior	Superior
Group (1)	.784	.300	.009	2.191	1.217	3.945
Gender (1)	.748	.290	.010	2.112	1.197	3.726
BMI	.005	.047	.914	1.005	.917	1.101
Want to lose weight	-.174	.328	.595	.840	.442	1.597
Constant	-1.029	.873	.238	.357	.000	.000

Legend: (1) = first category that was taken as reference for categorical variables included in the model; B= β quotient; SE = standard error of the β quotient; p= p value; OR= odds ratio

DISCUSSIONS

There are numerous reasons for which fruit, vegetable and juice squeezed from fresh fruit and vegetable are part of the recommendation for daily consumption: they provide a significant share of nutrients including magnesium, potassium, fibres, vitamins A, C and K, and all these with a low calorie intake. Both European and American guidelines recommend daily consumption of fruit and vegetable, at least the equivalent of 2-3 fruits per day and 3 portions of vegetable (approximately 170 g/portion) [4.5].

Rasmussen and collaborators [6] have reviewed 49 studies investigating the differences of fruit consumption behaviour between genders in the case of children and teenagers and they have found a higher consumption at girls in 27 of the studies, similar to what we have found for the age group of 15 to 18 years. In 18 of the studies they have found no difference between

genders, similarly to our results for the age group of 11 to 14 years. Depending of the origin of the studies, the differences between genders prevailed in the case of European studies, whereas in American study the lack of difference was predominant. In the same review, authors have found a negative association between growing in age and the frequency of consumption in the case of 10 of the studies that have included this parameter, similar to our results in the case of boys.

A recent study conducted on 2468 children from Belgium and The Netherlands [7] has not revealed any differences between genders as related to the frequency of fruit consumption in the case of 11-years old children, which is similar to our own results. They have built a model where the predictors of optimal fruit consumption were: school brunch consisting of fruit, positive example from friends and family, family insisting on fruit consumption, awareness of the positive effects and optimal quantity to be consumed but also the taste of fruit. The study highlighted the fact that most important predictors of optimal vegetable consumption were: feminine gender, family insisting that they eat fruit, vegetable being cut into small chunks by an adult, positive consumption example from family and friends along with the preference for vegetable consumption.

In a study from Sweden [8] performed on 474 16-years old teenagers, it was aimed to investigate the influence of fruit juice consumption, but also of other soft drinks on overall food consumption and on lifestyle. The authors have concluded that a higher share of fruit juice and soft drinks was associated with a lower share of milk and cooked food.

Other authors from USA [9] have followed the effects of an intervention that consisted on offering fruit and vegetable in certain classes of students, as part of a program to increase consumption between the years 2006/2007. They have noticed that, after school hours, the students which have received fruit and vegetable were significantly more likely to consume an optimal quantity of fresh fruit as compared to other students whose classes did not benefit from this program. As for vegetable consumption, no differences were noticed between the students who benefitted from the intervention and the students who did not.

CONCLUSIONS

65.6% of gymnasium pupils and 47.5% of high school pupils consume fresh fruit daily. In the age group between 15 and 18 years, girls consume fresh fruit significantly more frequently than boys.

Daily consumption of juice prepared from fresh fruit is indicated by 25.6% of the pupils with ages between 11 and 14 years and by 18.6% of those between 15 and 18 years, with no difference between genders or age groups in terms of the frequency of consumption of fresh fruit juice.

The factors that contribute significantly to the decision to consume fresh fruit daily in connection with the desire to lose or maintain weight are gender and age group. Cases of girls who consume fruit daily are 2.11 times for frequent than the cases of boys who do so. The number of pupils in the age group between 11 and 14 years which consume fruit dailiy is 2.19 times higher than the number of high school pupils who do so.

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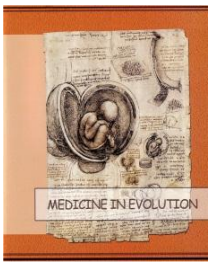
THE IMPORTANCE OF BODY COMPOSITION IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE



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ABSTRACT

Chronic obstructive pulmonary disease (COPD) is a chronic inflammatory disorder of the lungs and the whole body, caused mainly by tobacco smoking. Patients with advanced COPD are in state of malnutrition; the quality of life and exercise performance of these patients are deteriorated, the vital prognosis is unfavorable, and the medico-economic burden caused by poorly nourished patients is extremely high. The causes of malnutrition in patients with COPD are multifactorial and include decreased oral intake, effect of chronic systemic inflammation, and the effect of increased work of breathing due to abnormal respiratory mechanics. This review highlight insights in generic and disease-specific nutritional issues from recently published peer-reviewed articles.

Key words: *COPD, nutrition, obese, cachexia, body composition*

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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a common condition characterized by a poorly reversible limitation in airflow resulting from inflammation and remodeling of the airways.[1]

This disease is recognized all over the world as a public health problem. In the US, it already affects more than 17 million people and is responsible for the loss of more than half a million deaths annually.[2]

As opposed to the cardiovascular diseases, for which the number of deaths has decreased over the last years, mortality due to COPD continues to grow. It is estimated that by 2020, COPD will be worldwide the fifth leading cause of death.[3]

The most important risk factor for the clinical manifestations and progression of COPD is tobacco smoking. Although 90% of all COPD patients are smokers, for unknown reasons only 20% of all smokers develop the disease.[4]

Malnutrition is a common and often under-recognized problem in patients with COPD. The prevalence of nutritional depletion is about 20% to 40% in outpatients and up to 70% in patients with acute respiratory failure or in patients awaiting lung transplantation. Malnutrition is multi-factorial among other, the increased secretion of inflammatory mediators (C-reactive protein, interleukin IL-8, IL-6, tumor necrosis factor-α), the increased metabolic rate due to the ventilator effort and the therapeutic use of sympathicomimetic drugs, together with the lack of appetite that results in decreased caloric intake and weight loss. Malnutrition is associated to the deterioration of physical performance and to the development of clinical complications. Survival studies have constantly shown higher mortality rates in underweight patients than in overweight patients with COPD.[5]

To remain healthy a daily flux through the system with an adequate balance between rest and activity is necessary for the organism. A sedentary lifestyle has adverse effects on the general health and patients with COPD show clear symptoms and signs related to inactivity such as muscle loss, which impairs exercise performance and leads to a limitation in ventilation at rest.

Regardless of the disease status, the prevalence of malnutrition increases with age, consistent with this concept, subject aged over 80 years have a five time higher prevalence of malnutrition than subject aged less than 50 years. Thus, we can say that COPD and ageing may contribute, at least in an additional manner, to malnutrition.[6]

Nutritional status is the result of the interaction of food intake, absorption and utilization of nutrients, and it is possible to define it through three variables: body composition, energy intake and body functionality. Malnutrition is an over-all term including: over nutrition, under nutrition, specific nutrient deficiencies and imbalance because of disproportionate intake.[7]

In the assessment of nutritional status, the World Health Organization (WHO) has adopted the body mass index (BMI) as the reference method to classify adults as underweight (BMI <18.5 kg/m^2), normal weight (BMI 18.5-24.9 kg/m^2), overweight (BMI 25-29.9 kg/m^2), or obese (BMI ≥30 kg/m^2).[8]

However, it has been demonstrated that BMI is inadequate to assess malnutrition in COPD patients, where reduction in the fat-free mass, especially in patients with over-represented fat mass, may not be detected by the BMI alone.[9]

Going beyond the classical descriptions of "pink puffer" and "blue bloater", recent statistical approaches

support the concept that body composition and body weight discriminate pulmonary phenotypes, and are good predictors of outcome independent of lung function impairment.[10]

An important progress represented the incorporation of body composition into nutritional assessment in understanding the systemic COPD pathophysiology and nutritional potential. Initially being considered an indicator of inevitable and terminal progression of the disease process, there is now evidence that unintended weight loss is not an adaptive mechanism to decrease metabolic rate in advanced COPD but an independent determinant of survival in these patients.[11]

It has been demonstrated the important role of muscle loss and decreased muscle oxidative metabolism in impaired physical performance, thus providing new evidence for nutritional supplementation as an adjunct to exercise training, not only limited to advanced disease but also in earlier disease stages. Moreover, a pivotal role of osteoporosis, visceral adiposity and poor dietary quality in COPD risk and progression has emerged, these facts positioning the dietary awareness and intervention as integral part of the disease management, from prevention to chronic respiratory failure.[12].

COPD FROM A METABOLIC PERSPECTIVE

Involuntary loss of body weight and muscle wasting affects physical functioning while overweight and obesity generally contribute to increased cardiovascular disease risk. It is well known that both elevated cardiovascular risk and musculoskeletal impairment are common, thus contributing to increased morbidity and mortality. It remains unclear whether COPD is influencing the development of these comorbidities or whether we should consider them as multimorbidity resulting from the interaction between genetic predispositions and overlapping lifestyle determinants. Beside to smoking and physical inactivity, research is showing that dietary habits are not only involved in the development of metabolic and cardiovascular diseases but can also affect the progression and aetiology of COPD.[13,14]

In a population based sample of 560 subjects with a new diagnosis of mild to moderate COPD Van Remoortel et al. investigated the effects of smoking and aging on the prevalence of premorbid risk factors and comorbid conditions as well as their association with objectively assessed daily physical activity in the preclinical stages of COPD. The result were compared with those of 60 smoking controls with normal lung function and 60 never smoker individuals, all of them age matched. The main finding showed that premorbid risk factors and comorbid diseases were significantly higher in preclinical COPD than in never smokers but were similar to smoking controls. Smoking and physical inactivity were identified as independent risk factors for the presence of two or more comorbidities. These observations question the concept that, for some comorbidities, COPD is an independent risk factor by showing that smoking and physical sedentary life style, but not as such, are associated with their development.[15]

Van Den Borst et al. researched baseline data and 7 year longitudinal data from 260 patients with obstructive lung disease, 157 smoking controls, 866 former smoking controls and 891 never smoker controls that participated in the Health, Ageing and Body Composition (Health ABC) study and investigated whether age related decline of lean

mass and physical function is accelerated by obstructive lung disease or smoking. In this study it was shown that older adults with mild to moderate obstructive lung disease and smokers without obstructive lung disease had a comparable compromised baseline profile of body composition and physical functioning, while 7-year longitudinal trajectories were, to a large extent, comparable to those observed in never-smokers without obstructive lung disease.[16]

The same author used propensity scores to match 729 persons with normal lung function to 243 persons with obstructive pulmonary disease to study COPD specific effects on visceral fat mass. Excessive abdominal visceral fat in COPD patients was observed despite a similar total and subcutaneous fat mass, contributing to increased plasma IL-6 which in turn was significantly associated with all cause and cause specific mortality after 9.4 years follow up. The most important observation was that patients with COPD, despite having a similar caloric content of the diet, were characterized by an important lower dietary quality as reflected by a higher intake of saturated fat, trans fat and cholesterol, as well as a lower intake of total dietary fibers and vitamin C. This coincided with a lower physical activity level and further demonstrates the need to consider lifestyle factor integrative in combating elevated cardiovascular risk in this population.[17]

Gouzi et al. tested whether muscle heterogeneity is an attribute of different phenotypes of the disease. They identified and validated two phenotypes of COPD patients showing a different peripheral muscle histomorphology and level of oxidative stress. Group 1 "atrophic" COPD patients showed reduced BMI, fat-free mass index, fibre cross-sectional area and increased oxidative stress, while group 2 COPD patients showed a moderate fibre type switch compared to sedentary controls.[18]

The degree of hyperinflation assessed by residual volume was higher in the "atrophic" cluster and the degree of airflow obstruction was less in group 2 (mean forced expiratory volume (FEV_1) 52% versus 30%), but was in line with the study population of Van Den Borst et al.[19]

To unbind if low muscle mass resembles a phenotypic characteristic of the emphysematous phenotype or whether emphysema per se also induces cachexia, longitudinal studies are needed including measures of respiratory pathology, muscle mass and ideally also molecular signatures in muscle biopsies that can be compared with cachexia induced by other diseases.[20]

A decreased skeletal muscle oxidative capacity in COPD due to loss of muscle mass and a muscle fiver type I to > II shift next to abdominal obesity, may also be a driver of increased metabolic and cardiovascular risk.[21]

A decreased muscle oxidative phenotype and mitochondrial dysfunction has been well established in advanced COPD but was recently observed in less advanced airflow obstruction.[19]

Preserved muscle oxidative phenotype but reduced potential for angiogenesis was observed by Gagnon et al. in mild COPD patients. These patients, however, were characterized by decreased levels of physical activities and evidence of systemic inflammation suggesting that these factors precede the development of overt limb muscle dysfunction in COPD patients.[22]

These analysis shows that nutrition and metabolism play an important role in respiratory diseases. The clinical relevance of obesity was highlighted in primary and secondary prevention across all respiratory diseases.

The most common definitions of malnutrition include weight less than 90% of the predicted value as given by the BMI of less than 18.4 kg/m^2. The terms "cachexia" and "malnutrition" are many times used alternatively and defined by BMI. However, there can be different states of low weight such as a patient with low body weight may have a normal muscle (fat-free) mass for height, but decreased fat stores. Patients who are starving will first lose fat, preserving muscle mass. Only as caloric restriction becomes severe will they lose muscle. On the other hand, certain conditions such as COPD can lead to cachexia, in which muscle and fat mass are lost despite of an adequate caloric intake. Thus, when assessing the nutritional state, simple measure such as BMI, may not characterize the whole nutritional state.[23]

Schools et al. distinguished in a large study of patients with COPD three different types of impaired nutrition: semistarvation (low BMI with normal or above normal fat-free mass (FFM) index), muscle atrophy (low FFM index and normal or above-normal BMI), and cachexia (low BMI and low FFM index). He observed that patients with muscle atrophy and those with cachexia had similar outcomes. On the other hand, the groups with normal or above-normal BMI had better survival rates. He concluded that the studied groups with low FFM had greater mortality than the others, and it appears that low FFM is a better predictor of mortality than low BMI.[23]

Muscle atrophy occurs in patients with COPD. Greater prognostic significance has FFM, which represents primarily muscle mass, than either BMI or percentage of ideal body weight. FFM can be measured using different techniques, including isotopic dilution methods and hydrodensitometry. A simpler method is to use bioelectrical impedance, assuming three body compartments of different impedances. An excellent correlation between FFM measurements by impedance and deuterium dilution in COPD patients has been observed by Schols. Finally, skin fold thickness is often used to estimate FFM; however, these estimates overestimate FFM compared to deuterium dilution.[23]

Weight loss results from negative net energy balance, which represents less energy intake than energy output. Daily energy expenditure is composed of three parts: resting energy expenditure (REE) accounting for 60%; diet-induced thermogenesis, accounting for less than 10%; and energy consumed for physical activity making up the rest. In patients with COPD, REE is elevated (~120% normal).[24]

In a study that included 10 malnourished and 9 normally nourished patients with COPD and 7 control subjects, Donahoe et al. observed that the oxygen cost of breathing in malnourished patients was significantly higher than in the normally nourished and control subjects. Therefore, he postulated that increased REE in undernourished patients with COPD is n part due to the increased oxygen cost of breathing.[25]

Increased work of breathing (WOB) cannot completely explain low body weight in patients with COPD. First, it would be expected that the more severe the obstruction, the greater would be WOB and REE. Nguyen and coworkers showed in a study that included 36 stable patients with COPD that REE did not correlate with the oxygen cost of breathing, FEV_1, RV, or TLC. Another reason that WOB cannot completely explain the nutritional deterioration in patients with COPD is that treatment with noninvasive positive pressure ventilation, which decreases WOB, did not reduce REE to normal.[26]

Tumor necrosis factor a (TNF-a) is a key proinflammatory cytokine associated with severe heart failure, infections, inflammatory diseases, and weight loss in malignancy. Di Francia et. al. observed that TNF-α levels are increased in underweight compared to normal-weight patients with COPD. Mean TNF-α levels in the underweight group were significantly higher than in the normal weight group.[27]

In the NETT study, sTNF-R levels were elevated in patients compared with control subjects.[28]

In contrast, Nguyen et. al. demonstrated a correlation between REE and TNF-α levels. An explanation for the differences between these two studies might be explained by the methodology in estimating the secretion of TNF-α. TNF-α release is intermittent, whereas its receptors are an index of overall integrated TNF-α release over time.

Muscle wasting by stimulating catecholamine secretion and muscle protein lysis can also be mediate by TNF-α. TNF-α causes an increase in REE even in normal subjects. However, the inconsistency of TNF-α levels in COPD suggests that this cytokine cannot be the only responsible leading to weight loss. It appears that the mechanisms for weight loss in COPD, and specifically in patients with emphysema, are multifactorial, and that the factors may affect different COPD phenotypes differently. In addition, chronic inflammation can lead to oxidant stress, which in turn leads to cell damage and drop-out (apoptosis).[29]

OBESITY IN COPD

Fat tissue accumulation impairs the ventilator function in adults and children. The increasing BMI is usually associated with a reduction in FEV_1, forced vital capacity (FVC), functional residual capacity, total lung capacity and expiratory reserve volume.[30,31]

In massive obesity, a clinically important restrictive pattern is usually observed, when the patients weight-to-height ration is 0.9-1.0 kg/cm or greater.[32]

However, a restrictive disorder can still be attributed to obesity when the weight-to-height ratio us less than 0.9 kg/cm. when obesity is less than massive, a restrictive defect should not be attributed to fat accumulation until other causes of restrictive impairment have been excluded.

A low FEV_1/FVC ratio (< 70%), is not a feature of respiratory diseases associated with obesity, although evidence of small-airway diseases has been reported in this context.[33]

Diffusion capacity can be increased in obesity, but this is not a rule. Respiratory muscle strength may be altered in obesity, as indicated by reduced maximal inspiratory pressure in obese subjects compared with control subjects with normal body weight.[32,34]

Functional status during exercise such as walking is reduced because of the higher metabolic cost of carrying the extra body weight although cardio respiratory fitness assessed by maximal oxygen consumption is generally preserved in obese patients.[35]

It has been observed a clear association between obesity and dyspnea. Obesity increases the work of breathing because of the reductions in both chest wall compliance and respiratory muscle strength.[34,36]

This phenomenon creates an imbalance between the demand on the respiratory muscles and their capacity to generate tension, thus leading to the perception of increased breathing effort.[37]

Moreover, dyspnea in obese patients can reveal other associated conditions, such as heart and respiratory diseases. Among these diseases, asthma deserves a special attention. Patients with obesity

frequently report dyspnea and wheezing and are therefore often given therapy for asthma without objective diagnostic confirmation by pulmonary function testing. An accurate diagnosis is important because dyspnea related to other mechanisms or diseases may require a different therapeutic strategy. Thus, the diagnosis of asthma or COPD should not be based only on symptoms but should also include spirometric confirmation.

CACHEXIA IN COPD

The majorities of patients with COPD are lean, and not infrequently in a state of marked under nutrition referred to as pulmonary cachexia. Often patients with advanced COPD present a decreased body weight. Weight loss is noted in 25%-40% of all COPD patients, with 25% of them in moderate to severe disease and 35% with extremely severe disease showing a reduced fat free mass index.[38]

A study that analyzed the data of COPD patients hospitalized with acute exacerbations demonstrated a positive correlation of the body weight with the FEV1% and a negative correlation between the BMI and duration of hospitalization.[39]

Furthermore, body weight has been demonstrated to be positively correlated with the FEV1, exercise tolerance and diffusing capacity of the lung, even in patients with stable-phase COPD.[40]

It has also been reported that COPD patients with a BMI of <20 kg/m^2 have a higher risk of acute exacerbations as compared to COPD patients with a BMI of 20 kg/m^2 or greater, and that patients exhibiting weight loss during a 1-year observation period are more prone to acute exacerbations than those who do not exhibit weight loss over the same period.[41]

As causes of under nutrition in COPD patients, energy insufficiency due to decreased dietary intake caused by appetite loss associated with diminished general physical activity, a depressive tendency, or dyspnea while eating can be speculated.[42]

Secondly, increased energy expenditure due to the high work of breathing may also account for the under nutrition. The REE is increased in COPD patients and increased REE has been demonstrated in lean COPD patients.[43]

The third major cause of under nutrition in COPD patients are the effects of humoral factors such as inflammatory cytokines, adipokines, and hormones on nutrition. COPD is generally recognized as a systemic inflammatory disorder not involving the lungs alone, and is characterized by increased production of inflammatory cytokines such as interleukin (IL)-6, IL-8, and tumor necrosis factor (TNF)-α, and also of chemokines.[44]

In addition to an increased cost of ventilation due to abnormal pulmonary mechanics, a higher ATP cost of muscular contraction can contribute to decreased mechanical efficiency of lower limb exercise and elevated daily energy requirements in some COPD patients.[45]

There is evidence for increased muscle protein degradation rate in cachectic COPD patients characterized by low BMI and low FFM.[46]

Stimulation of protein synthesis depends on the availability of amino acids in the blood stream. COPD patients with low FFM have low plasma levels of branched-chain amino acids (BCAAs) compared with age-matched controls.[47]

The extraction of dietary nutrients, especially amino acids, by the intestine has a critical influence on their availability to peripheral tissues and, therefore, on whole-body amino acid requirements. Lower splanchnic extraction associated with an enhanced anabolic response to a protein meal

was found in sarcopenic patients with COPD, which might be related to compromised intestinal function.[48]

Muscle wasting and weight and bone tissue loss may be induced or accelerated during severe acute exacerbations that require hospitalization, due to convergence of different catabolic stimuli induced by, physical inactivity, inflammation and systemic glucocorticoids, malnutrition and hypoxia.[49]

In acute respiratory exacerbations, loss of appetite and reduced dietary intake are often experienced together with increased systemic levels of appetite-regulating hormone leptin and pro-inflammatory citokines. Furthermore, impaired responsiveness to signaling cues of muscle regeneration and protein synthesis may delay recovery and increase the risk for readmission.[50,51]

CONCLUSIONS

Searching the literature we have seen that nutrition and metabolism are an up to date topic in respiratory diseases. Being malnourished is a poor prognostic indicator in patients with COPD. However, the mechanisms for this are not clear. The long term effect of malnutrition, as well as anabolic and appetite stimulating interventions need to be evaluated in multisite, well controlled clinical studies.

Undernutrition in patients with COPD is an important risk factor for reduced physical exercise performance, deteriorated quality of life, risk of exacerbations and vital prognosis. The most important causes of undernutrition in COPD patients included decreased dietary intake and increased energy expenditure associated with aggravation of the disease state and also the eefects of inflammatory cytokines, adipokines and hormones.

The influence of obesity on obstructive sleep apnea and asthma has been well documented in the literature and weight loss is associated with improved symptomatic control in these diseases but the impact of obesity on COPD patients is much less studied. Obesity could modify the clinical image of COPD because of its effects on the perception of dyspnea and exercise tolerance. The usual recommendation of increase physical activity is difficult for these patients to implement since they have a sedentary lifestyle created by the shortness of breath.

Severe COPD an ageing are independent and probably concurrent conditions leading to malnutrition. COPD influences aspects related to body composition, whereas both COPD and ageing contribute to poor body functionality.

Future clinical researches overlapping respirology and metabolism with the aim to unravel the role of malnutrition in COPD patients is highly needed.

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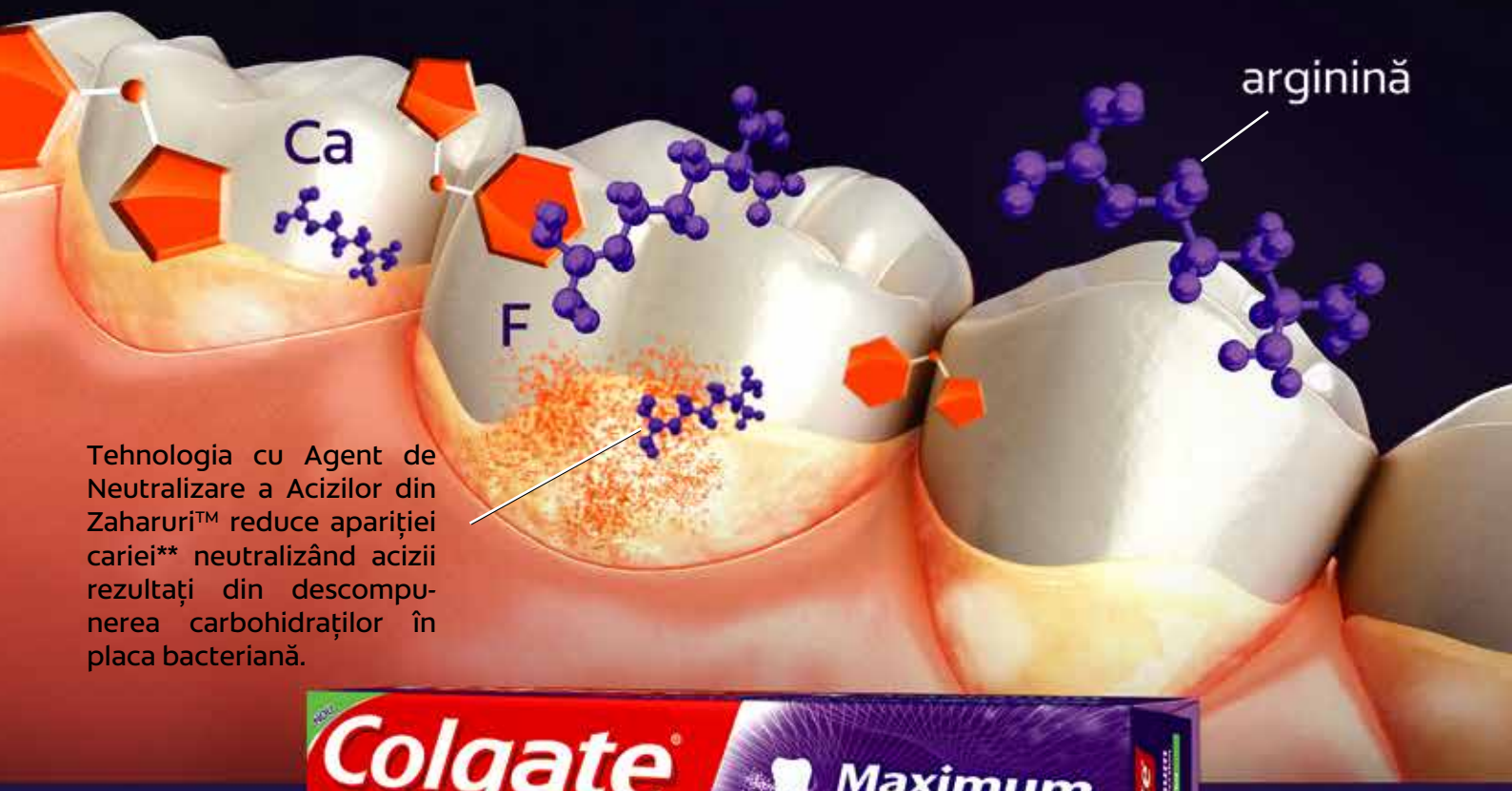

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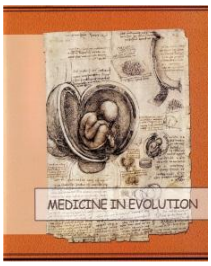

CLINICAL STUDY REGARDING PREVALENCE AND CHARACTERISTICS OF SUPERNUMERARY TEETH IN A GROUP OF ORTHODONTIC PATIENTS

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ABSTRACT

The majority of published studies have evaluated the prevalence of supernumerary teeth in general population. Our research is aimed to investigate the prevalence, location, characteristics of supernumerary teeth among orthodontic patients.

A retrospective study was performed using dental casts and panoramic radiographs of 500 patients, ranging in age from 5 years and 3 months to 40 years. Data regarding patients characteristics, number, type, shape, location of supernumerary teeth were collected and statistically analyzed.

36 patients, aged between 6 years and 4 months, respectively 40 years, presented one or more supernumerary teeth. A total of 56 supernumerary teeth were diagnosed and evaluated. Males were affected more than females (M:F = 1.53:1). The mesiodentes and supernumerary lateral incisors were the most frequently diagnosed type of supernumerary tooth. Regarding supernumeraries morphology, supplemental was the most common in this study (35.72%, half of them incompletely developed), followed by geminated/fused teeth (21.43%). At young ages most often were found erupted supplemental teeth and conical supernumerary teeth. 71.43% of supernumerary were diagnosed on the maxilla. 50% of supernumerary teeth produced changes in the stomatognathic system.

The evaluation of supernumerary's type and location and of the effect on the adjacent normal teeth represents one of the main requirements for the establishment of an optimal therapeutic attitude.

Key words: *supernumerary teeth, location, morphology, local complications, patients characteristics.*

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INTRODUCTION

Supernumerary teeth, defined as the existence of an excessive number of teeth in relation to the normal dental formula, are fairly common in dental practice, interesting 0.1-3.8% of the general population in our country (Boboc 1971, *2;* Ionescu, 2000, *10).* A supernumerary teeth prevalence of 1% to 3% is usually found among Caucasians, while in East Asian countries and in patients with cleft palate or cleidocranial dysplasia syndrome, the prevalence rates are higher – even 6.9%- (Brook 1974*, 3;* Batra et al., 2005, *1;* de Oliveira Gomes et al. 2008, *4;* Szkaradkiewicz et al. 2011, *19*).

These dental anomalies can occur both in the permanent and temporary dentition, but the prevalence of temporary dentition is five times lower (Sedano and Gorlin 1969, *17;* Sykaras 1975, *18).* Supernumerary teeth can occur in almost all regions of the dental arch, but they are more frequently found in the anterior region of the upper jaw as mesiodentes or as supernumerary lateral incisors (Roberts et al., 2005, *16).* Distribution of supernumerary teeth appears to differ according to sex; various authors have found that male/ female ratio is 2.2: 1 or 2: 1 (Brook 1974, *3;* Rajab and Hamdan 2002, *15).* Another study reported gender distribution of 1.3:1 (Luten 1967, *13).*

Objectives: To assess general characteristic of orthodontic patients with dental surplus and to evaluate the prevalence, location and morphologic characteristics of supernumerary teeth.

MATERIAL AND METHODS

A retrospective study was performed using dental casts and panoramic radiographs of 500 patients, randomly selected from the thousands of cases that have sought consultations in 2009-2014, ranging in age from 5 years and 3 months to 40 years. For each patient were recorded demographic variables (sex, age, place of birth); family history related to stomatognathic system; general health state (in particular, the possible presence of a genetic syndrome); constitutional type; diagnosis after Angle classification and German school.

For patients with supernumerary teeth we recorded 17 other variables: number, location, position, type (supernumerary mesiodentes, central incisors, lateral incisors, canines, premolars, paramolars, or distomolars), and morphology of supernumerary teeth, associated pathologies or complications, and whether any treatment has been carried out. Morphology of supernumerary teeth was assessed as supplemental, conical, tuberculate, dens invaginatus (dens in dente), odontoma, geminated/fused teeth, developing tooth bud and atypical (Garvey et al. 1999, *6*).

The IBM SPSS_Statistics_Trial_17 statistical package was used for the application of inferential statistical tests, depending on the chosen variables type (ANOVA test, t-student, chi-square, Fisher). The threshold of statistical significance tests (statistical significance p coefficient) was set at maximum 0.05 (an event in 20 can occur by chance), level accepted by the scientific community to reject the null hypothesis of the test.

Results: 36 patients, aged between 6 years and 4 months, respectively 40 years, had one or more supernumerary teeth, resulting a 7.2% total prevalence among orthodontic patients of the Clinic of orthodontics and dental-facial orthopedics in our University; 0.4% of patients were diagnosed with dental surplus in

temporary dentition; for 0.2% of patients, the supernumerary teeth were diagnosed both in deciduous and permanent dentition, and 6.6% in permanent dentition. The prevalence of supernumerary temporary teeth fall within the limits described in the literature, and the frequency of supernumeraries in permanent dentition appears higher than other published studies in Romanian population (cited by Boboc, 1971, *2;* Ionescu, 2006, *11),* possibly due to the study group characteristics (comprising orthodontic patients), and to the inclusion between supernumerary clinical forms of fused, geminated teeth, odontomas, unlooked by other authors.

The ages at which these patients were diagnosed cover a wide range, from 6 years and 4 months and 40 years. The average age of patients in the group is 12 years and 7 months, most of them being in the period of growth and development: 78% of respondents are between 6-14 years old. The median value is 10 years and 10 months, with a standard deviation of 6 years and 10 months; 52.77% of cases are in the range of 6-10 years, 38.88% have between 10 to 20 years, and only 8.32% have more than 20 years (5.55% have 25-30 years and 2.77% of patients 40 years old).

At young ages most often were found erupted supplemental teeth and conical supernumerary teeth. As the patients' age increases, the more frequently identified types of supernumerary included odontomas and dental buds. Differences between age groups are statistically significant.

Regarding sexual dimorphism, our data tally with those of the majority of published studies, highlighting the greater frequency of supernumerary teeth in males (58.33% of the study group). Statistical data processing research revealed a M:F ratio of 1.53:1 in the permanent dentition. Similar figures were reported by Rajab and Hamdan 2002, *15;* Fernández Montenegro et al. 2006, *5;* Gündüz et al. 2008, *8;* Wang and Fan 2011, *20.* For temporary supernumerary teeth, an equal prevalence of both sexes was found, and patients with dental surplus in both tooth series belonged to the female sex.

The gender distribution in the age groups is following the trend observed in the entire batch: the number of girls is lower, excluding ages 7, 12, 13 and 18 years, when girls experienced more supernumerary teeth (Figure 1). Gender differences between age groups are statistically significant ($p = 0.04$, calculated with Chi-square test).

In the 36 patients with dental surplus, a total of 56 supernumerary teeth were diagnosed, resulting in an average number of 1.55 teeth per person (1.53 supernumerary teeth for females, and 1.57 supernumerary teeth for males). Most of the patients had one supernumerary tooth (24/36 - 66.6%), 7 patients (19.44%) had two supernumeraries, 4 patients (11.11%) had three, and 1 patient (2.77%) had six supernumerary teeth. The mesiodentes and supernumerary lateral incisors were the most frequently diagnosed type of supernumerary tooth (each type 12/56, 21.42%), followed by another types of supernumerary teeth in central incisor's area (11/56, 19.64%), supernumerary premolars (9/56, 16.07%), supernumerary paramolars (5/56, 8.92%), supernumerary distomolars (4/56, 7.14%), and supernumerary canines (3/56, 5.35%).

Compared to the number of investigated patients, we can appreciate the prevalence of different types of supernumerary teeth (tab. 1).

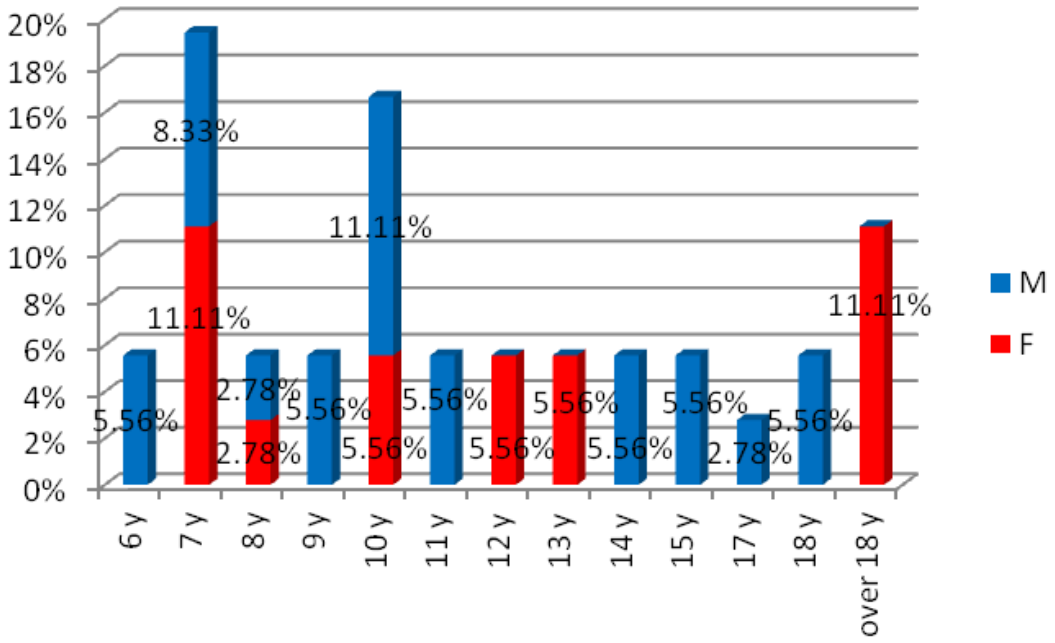

Figure 1. Gender and age distribution of patients with supernumerary teeth; F = females, M = males. (p = 0.04, Chi-square test)

Table 1. *The prevalence of supernumerary teeth in the entire group, based on their type and location in the affected dental arch*

Dental series	**Supernumerary type's prevalence**						
	Mesiodentes	Another type of supernumerary in the central incisor's area	Supernumerary lateral incisors	Supernumerary canines	Supernumerary premolars	Supernumerary paramolars	Supernumerary distomolars
Temporary dentition	1 (0.2%)	0	0	1 (0.2%)	1 (0.2%)	0	0
Permanent dentition	11 (2.2%)	11 (2.2%)	12 (2.4%)	2 (0.4%)	8 (1.6%)	5 (1%)	4 (0.8%)

Descriptive statistical analysis of mesiodentes

The majority of the 12 mesiodentes (58.33%) were diagnosed at 6-7 years, 83.3% of them representing the main reason for patient presentation (directly - 66.6% - or for consequences produced within dental arches). The average age of diagnosis for this type of supernumerary was 9 years and 9 months. None of the patients with mesiodentes, or another type of supernumerary teeth in the central incisor, had any impairment of general health.

Only 16.66% of mesiodentes were discovered by chance, radiological, percentage lower than 33%, as communicated by Mossaz et al., 2014 *(14)*. 91.66% of mesiodentes teeth belonged permanent dentition, the rest were diagnosed in the temporary dental series. All mesiodentes were located in the upper jaw, predominantly on the right side. 75% of mesiodentes were erupted, the majority (58.33%) was aligned into the arch line, and the rest of them displaced over the palate.

The position of the tooth was normal or inclined in 91.67%, and inverted in 8.33% of mesiodentes. From a morphological perspective, most were conical (58.33%), followed by supplemental (25%).

In 12.5% of cases, mesiodentes were located 0.5 mm or less from the nearest central incisor. The average distance to an erupted incisor was 1.62 mm. The vast majority of mesiodentes (91.66%) have caused local changes

(dental malpositions or permanent tooth impaction), and 16.66% were responsible for the occurence of static and dynamic occlusion disorders.

Descriptive statistical analysis of other supernumerary teeth in the central incisor's area

Beside mesiodentes, central incisor's area was affected, in group patients, by the emergence of eight geminated teeth and three odontomas. The average diagnosis age (11 years and 3 months) of these teeth was higher than that of mesiodentes, 36.35% of supernumerary teeth being the main reason for patient's presentation (directly - 18.18%, or for their intraoral consequences - 18.18%). More than half (54.55%) of supernumerary teeth included in this subchapter were found during clinical examination by inspection (geminated / merged teeth).

Unlike mesiodentes, whom were also diagnosed in temporary series, the other types of supernumerary teeth diagnosed in the central incisor's area belonged only to permanent teeth series. These supernumerary teeth were located on mandible (18.18% of cases), most on the right side.

27.27% of other central incisor supernumerary teeth were included (odontomas), the rest (geminated teeth) being erupted, 63.64% within dental arches. 63.64% of this region's geminated teeth and odontomas are responsible for intraoral pathology, often leading to dental crowding. 18.18% of teeth described in this section interfered with anterior guidance.

Descriptive statistical analysis of supernumerary lateral incisors

In the lateral incisor's region were diagnosed 12 supernumerary teeth in patients over 7 years, with an average age higher than the subjects in the preceding subsections - 14 years and 4 months. Relationship between genders appears reversed if supernumerary teeth occur near the lateral incisor, females being more frequently affected by the occurrence of supernumerary teeth in this region (same situation was found only in supernumerary premolars). 8.33% of supernumerary lateral incisors emerged in the context of a genetic syndrome. In one third of cases, the supernumerary lateral incisor was the main reason for patient's presentation (directly - 25% of cases or due to local oral changes).

The supernumerary lateral incisors were diagnosed only in permanent dentition. The majority of supernumerary lateral incisors were placed on the maxillary right side, two thirds were erupted, mostly aligned within arches.

Morphological, a quarter of supernumerary laterals were supplemental, another quarter were geminated / merged teeth. Only in this region were diagnosed invaginated teeth (16.67% of supernumerary teeth in this region). Among supernumerary laterals erupted as an independent tooth structure, 50% were placed less than 0.5 mm of a neighboring tooth. Overall, 58.33% of erupted supernumerary lateral incisors produced intraoral changes and 8.33% led to the installation of anterior crossbite.

Descriptive statistical analysis of the supernumerary canines

In the canine's region, supernumerary teeth (three teeth) were diagnosed on average at the age of 8 years and 7 months; one being a temporary supernumerary tooth, the others were permanent supernumerary teeth. A third of diagnosed patients were submitted due to intraoral changes produced by supernumerary, the other supernumerary canines were revealed by clinical examination or imaging procedures.

The canine's area is described in literature as rarely interested in the emergence of supernumerary teeth (Rajab and Hamdan 2002, *15;* Gay Escoda et al., 2004, *7).* In the investigated group, one third of patients with supernumerary canines

had genetic syndrome and another third, labio-maxillo-palatal cleft.

All supernumerary canines were located on the left side, 66.66% of them on the maxilla. Two-thirds of supernumerary canines were included; the rest erupted within dental arches. Morphological, a third of supernumerary canines showed similar morphology to those of normal series, a third were conical teeth, the other third, fused teeth type. 33.33% of all supernumerary canines produced malpositions of neighboring teeth or crossbites.

Descriptive statistical analysis of supernumerary premolars

The 9 supernumerary premolars were diagnosed on average at 12 years and 9 months, more commonly in women. 22.22% of supernumeraries were found in patients with genetic syndrome, and 11.11% in cases with dentinogenesis or amelogenesis imperfecta.

None of supernumerary premolars represented main reasons for patient's presentation, being discovered only after clinical and radiological examination. One explanation for this could be the eruptive stage of these supernumerary formations: only 11.11% of them were erupted, the rest were located intraosseous; none of them produced intraoral changes.

In the investigated group, along with the canine's region, the premolar sector is the second area interested in supernumerary temporary tooth formation. Supernumerary premolars were found more frequently in mandible, preserving preference for the right side. Morphological, most supernumerary premolars were supplemental type (88.89% were premolar-like tooth or dental developing bud), the rest being odontomas.

Descriptive statistical analysis of supernumerary paramolars

The average age of diagnosis of supernumerary paramolars in the investigated group is the highest compared to the other supernumeraries ages of: 23 years and 11 months. 80% of supernumerary paramolars were odontomas, radiological depicted and 20% of them were supplemental type, clinically detected.

All supernumerary paramolars belonged permanent dentition, the vast majority of being included. Similar to the supernumerary premolars, the paramolars were 4 times more often diagnosed on the mandible, especially on the right side. The erupted paramolars presented intimate proximity reports with normal molars. Overall, 20% of paramolars caused delayed eruption or inclusion of molars.

Descriptive statistical analysis of supernumerary distomolars

Posterior to the last permanent molar, four supernumerary teeth were detected in investigated patients; this type of supernumerary tooth is known by most authors as "distomolar". The average age of diagnosis was 19 years and 9 months, all supernumeraries being radiological diagnosed.

The supernumerary distomolars were found more frequently in male patients (M: F = 3: 1), permanent teeth belonged, being located 3 times more frequently in the upper jaw, with equal distribution on the two arcade.

The morphology of distomolars was in 75% of cases, similar molar's developing bud, a quarter being intraosseous odontomas. 25% of distomolars produced malpositions of adjacent normal teeth.

Table 2. *Descriptive data regarding patients characteristics, location, morphology, and associated complications of supernumerary teeth*

Descriptive data		Mesiodentes	Other supernumerary central incisors	Supernumerary lateral incisors	Supranumerary canines	Supranumerary premolars	Paramolars	Distomolars
Number		**12**	**11**	**12**	**3**	**9**	**5**	**4**
Gender	Male	66.67%	72.73%	41.67%	66.67%	44.44%	60%	75%
	Female	33.33%	27.27%	58.33%	33.33%	55.56%	40%	25%
Health state	Clinical health	100%	100%	91.67%	33.33%	66.67%	100%	100%
	Genetic syndrom	0	0	8.33%	33.33%	22.22%		
	Labio-maxillo-palatal cleft				33.33%			
	Amelogenesis/dentinogenesis imperfecta					11.11%		
Supernumerary tooth diagnosis	Main presentation reason	66.67%	18.18%	25%				
	Presentation for oral complications	16.67%	18.18%	8.33%	33.33%			
	Randomly clinical detection	0	54.55%	33.33%	33.33%	11.11%	20%	
	Randomly radiologic detection	16.67%	9.09%	33.33%	33.33%	88.89%	80%	100%
Tooth type	Permanent	91.66%	100%	100%	66.66%	88.89%	100%	100%
	Deciduous	8.33%	0	0	33.33%	11.11%		
Jaw	Maxilla	100%	81.82%	75%	66.66%	44.44%	20%	75%
	Mandible	0	18.18%	25%	33.33%	55.56%	80%	25%
Side	Right	66.67%	63.64%	58.33%	0	66.67%	60%	50%
	Left	33.33%	36.36%	41.67%	100%	33.33%	40%	50%
State of eruption	Erupted within dental arch	58.33%	63.64%	50%	33.33%			
	Labial erupted	0	9.09%	8.33%			20%	
	Palatal erupted	16.67%	0	8.33%		11.11%	80%	
	Impacted	25%	27.27%	33.33%	66.67%	88.89%		100%
Position	Normal	41.67%	63.64%	58.33%	33.33%	33.33%		25%
	Inclined	41.67%	9.09%	25%	66.66%	44.44%	20%	50%
	Inverted	8.33%						
	Transverse/horizontal	8.33%						
Supernumerary tooth morphology	Supplemental	16.67%		25%	33.33%	33.33%	20%	
	Conical	58.33%		8.33%	33.33%			
	Dens invaginatus			16.67%				
	Tuberculate	8.33%						
	Geminated tooth		54.55%	16.67%				
	Fused tooth		18.18%	8.33%	33.33%			
	Developing tooth bud	8.33%		8.33%	55.56%			75%
	Odontoma		27.27%	16.67%	11.11%		80%	25%
	Atypical	8.33%						
Proximity – for erupted supernumerary	< 0.5 mm to adjacent tooth	12.5%		50%			100%	
	> 0.5 mm to adjacent tooth	87.5%		50%				
Associated local pathology	Asymptomatic	8.33%	36.36%	41.67%	66.66%	100%	80%	75%
	Inclusion/delayed eruption	33.33%		8.33%			20%	
	Dental malposition	25%	18.18%	16.67%	33.33%			25%
	Ectopic tooth	33.33%	36.36%	8.33%				
	Increasing dental crowding		9.09%	16.67%				
	cystic degeneration			8.33%				
Malocclusion	Without influence	83.33%	81.82%	91.67%	66.66%	100%	100%	100%
	Crossbite	8.33%	9.09%	8.33%	33.33%			
	Modification of anterior guidance	8.33%	9.09%					

DISCUSSIONS

Supernumeraries appeared in a variety of shapes, with supplemental being the most common in this study (35.72%, half of them incompletely developed), followed by geminated/fused teeth (21.43%), odontomas (19.64%), conical (16.07%), dens invaginatus (3.57%), tuberculate, and atypical (each 1.79%).

Analyzing statistical data on the location of supernumerary teeth, tooth morphology reported, the research revealed statistically significant differences in jaw distribution, in favor of maxilla, where 71.43% of supernumerary were diagnosed (yielding a ratio maxillary / mandible 2.5 / 1); significant differences were found on supernumerary location: 37.5% of supernumerary teeth were aligned within dental arches, and 7.14% palatal displaced.

On the maxilla, most frequently were diagnosed supplemental teeth (fully developed or dental buds), followed by conical and geminated teeth. The mandible was more frequent affected by odontomas formation. The right side is relatively more often interested in supernumerary event occurrence without the differences to be statistically significant.

According to data presented in the literature (Ionescu 2000, *10),* our study showed the prevalence of frontal area, 67.86% of supernumerary teeth belonging to this region. Central incisor area, with 41.07% of supernumeraries them belonging, appears as the most affected by this dental anomaly. On the posterior areas, premolar - molar, most frequently supernumerary teeth are included, represented by odontomas or dental developing buds. The differences in the location of a particular type of supernumerary on arches sectors are statistically significant ($p < 0.001$, Chi-square test).

Analyzing historical data, we found that in the study group, only 23.21% of supernumerary teeth were the main reason of patient's presentation (all supernumerary incisors), other 10.71% "guiding" the patient to the specialist by intraoral pathology and changes due to supernumerary tooth. The rest of supernumerary teeth were found in clinic: 21.43%, during clinical examination, and 44.64% after the imaging investigations, often represented by panoramic radiography.

According to our data, statistically significant ($p < 0.001$, Chi-square test), the mode of supernumerary tooth detection appears related to the type and location of supernumerary. If supplementals and supernumerary incisors were the most frequently tapered presentation reasons, geminated teeth are those who have been most clinically detectable. 44.64% of supernumerary teeth (dental developing bud type and odontomas, commonly located in posterior arch areas) were diagnosed radiographically.

Overall, after clinical examination and imagistic investigations, 50% of supernumerary teeth produced changes in the stomatognathic system. Variations in the morphology of supernumerary teeth, related to intraoral changes, are statistically significant. Responsible for intraoral pathology are primarily conical supernumerary teeth (more than three quarters of them were responsible for various local pathologies), geminated teeth (over half produced local changes) and supplemental type (over a third have produced oral changes). The literature has previously reported similar percentages of supernumerary teeth that produced local changes (46.9-59% - Liu et al., 2007, *12;* Hyun et al., 2009, *9)* or even higher (77.7 -80.9% - Gündüz et al., 2008, *8).*

The main local changes caused by the presence of supernumerary were represented by: inclusion or delayed

eruption of a permanent tooth; malposition of neighboring teeth (the most common alteration detected in our study); cystic degeneration (rarely encountered this type of pathology at 1.79% of supernumerary teeth). In terms of static and dynamic occlusal relationships, supernumerary tooth placements have affected them in 10.71% of cases.

CONCLUSIONS

Supernumerary teeth occur alone or in multiple in any region of the jaws, mostly in male patients. The supernumerary teeth are most often located in the anterior maxilla and are supplemental in shape.

The optimal therapeutic attitude to the presence of supernumerary teeth depends on the supernumerary type and location and the effect, or potential effect thereof on the adjacent normal teeth.

Whatever the general context of malocclusions, both from the point of view of the doctor and the patient, as early diagnosis is important for full exploitation of the benefits of growth and for capturing dental anomaly in an early stage.

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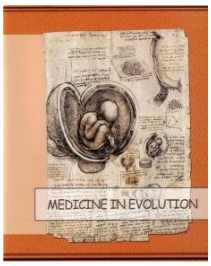
PSYCHO-BEHAVIORAL MANAGEMENT AND DIRECTIONS FOR PROMOTING THE ORAL HEALTH IN ROMANIA



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ABSTRACT

Dental diseases can negatively influence a person's life, because the oral inflammation and advanced caries causing great pains and all congenital defects and premature losses of teeth lead to the reduction of confidence, alteration of self-image and loss of her welfare. It is important that our attention should be focused on health and not on disease. There is a concept called sense of coherence (SOC), which explains why some people become sick under stress, while others remain healthy. This concept was formulated by Aaron Antonovsky in 1979 and consists of the ability to understand and manage the events of human life. It was found that in Romania are deficiencies regarding the oral health because of the high cost of dental treatment and the lack of dentists in rural areas of the country.

Key words: *psycho-behavioral management, dental diseases, deficiencies, oral health, resistance resources*

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I. MODERN AND STATISTICAL PRINCIPLES OF ORAL HEALTH IN ROMANIA

Oral health represents the absence of disease which affects the mouth and oral cavity, such as advanced caries, oral inflammations, congenital defects, oropharyngeal cancer, etc.

1. Affections of oral cavity

In the present society, oral cavity diseases are very common, and their impact on human life is significant. According to World Health Organization statistics, caries and periodontal diseases are the most common problems of the oral cavity and represents up to 10% of total annual costs in the health services. In childhood, the most common chronic disease of the oral area is the disintegration of teeth on occlusal surfaces of the molars or in the incisors maxillary. Children with the highest risk are those who come from poor families or children with special needs.

2. Modern principles of health after Aaron Antonovsky

2.1. Applying the concepts of Aaron Antonovsky

a. The concept of ensuring the health of people

Aaron Antonovsky is the creator of this concept and he started from studying the origin of health and ways to create health. He initiated a new branch of medicine that deals with ensuring the health of the population, by studying the social environment as pathological factor, the influence of housing and working conditions, the phenomenon of urbanization, of pollution etc. Aaron Antonovsky has acquired professional knowledge on health insurance concept by studying biographical and psychological particularities of Holocaust survivors in Israel. Despite the horrors they went through, the health and welfare of survivors prospered after overcoming those traumatic events.

Antonovsky explained in 1979 how his experiences helped him to analyze the way people survive and overcome the most difficult moments of their lives. In 1987, Aaron Antonovsky showed that women who survived the Holocaust have a better emotional health than a control group which owns general resources to combat the stress factors. Also, Engel explained how the disease affects us and he classified the factors that are generating it in: biological, psychological and social.

b. The sense of coherence from the salutogenic perspective

The sense of coherence is the ability to perceive stressful situations and the ability to use existing resources to combat stress. In this concept there are three essential elements: the understanding means the faith that everything happens in a predictable way, the ability to manage stressful situations is the belief that we have near us the resources to control them, and the understanding of significance of those stressful situations means the belief that every event in a person's life has a reason and a purpose.

c. Questionnaires that shows the correlation between sense of coherence and oral health

Research has shown that people who have a greater sense of coherence have a lower risk of disease. Initially, Antonovsky has developed two questionnaires entitled: SOC-13 and SOC-29. Questionnaires below measures:

- Perception of wealth (*Perceived Wellness Scale* (PWS) – created by Adams);
- The positive actions recommended from a medical viewpoint for a better health (*Health Promoting Lifestyle Profile* (HPLPII) – created by Susan Noble);
- The mental continuum transition from a positive state to a

negative state (Mental Health Continuum (MHC) created by Keyes);

- The oral health status explained through several factors related to oral cavity (Oral Salutogenic Score (OSS)).

The Finnish scientist, Jarno Savolainen, has made an important contribution in the field of oral health through the book he published it in 2005 at the University of Oulu. This book aims to demonstrate the connection between sense of coherence and oral hygiene, which is very important for stopping the periodontal and oral diseases. (Savolainen, 2005).

2.2. The main directions for promoting the oral health after Silva (2008)

In 2008, a team of researchers led by Andreea Neiva de Silva pointed out the importance of oral hygiene in terms of ensuring the health of the population. Moreover, they showed that to overcome the social problems, but also the inner ones of man is very important the connection between the oral health and sense of coherence. (Silva et al., 2008).

The five directions of oral health promotion are:

1. Health promotion by public policies (identifying the main issues and risk factors on health in the community).

2. Creating a favorable environment to increase the availability of foods and drinks with low risk to dental health, but also for ensuring a social support group for adopting a good oral hygiene.

3. Controlling the factors that affect the oral health and increase it`s promotion.

4. The increase of personal skills to control their own decisions regarding the health.

5. The education and growth the level of public understanding for the knowledge of risk factors in the sphere of oral health.

II. THE RISK FACTORS IN ORAL HEALTH

A. The risk factors bio-psycho-social

These factors include genetic predisposition and acquired orthodontic changes, which affect the overall health of the person. Examples of risk factors:

a) Biological risk factors

- The premature birth;
- The weight too little at birth;
- Genetic mutations;
- Disorders of the central nervous system, etc.

b) Social and psycho-behavioral risk factors

- Low socio-economic conditions;
- Single-parent families;
- Mothers with low education;
- Parental psychopathology;
- Child abuse (psychological, emotional, physical, sexual), etc.

B. Risk factors determined by lifestyle and eating habits (eating disorders)

Poor oral hygiene means improper use of toothbrush and toothpaste.

A diet rich in sugar and fat and low in fiber, strict diets without vitamins or eating disorders (anorexia, bulimia), and poor oral hygiene and nutrition of the mother during pregnancy can have serious consequences for teeth and gums.

- **Anorexia** is an abnormal fear of overweight and distorted image of your own body. This eating disorder usually affects teenagers by refusing food consumption. Clinical signs: loss of muscle mass, dry skin, brittle hair, dehydration, constipation, sleep disorders, and oral signs are reducing gingival health, dental erosion because of induced vomiting, etc.

- **Bulimia** is an eating disorder more common than anorexia and is characterized by excesses and use of laxatives with minor weight loss. Food is restricted and to eliminate it the person will induce vomiting or she will use laxative excessively. Oral signs are: demineralization of enamel, dental hypersensitivity, enamel erosion, Injuries caused by different objects, dry mouth, esophageal irritation, etc.

Diabetes increases the risk of gum disease, tooth loss, tooth decay, but also of a various oral infections that lead to high blood sugar and thus it requires more insulin.

C. Risk factors determined by vicious habits

Smoking is responsible for the appearance of numerous periodontal diseases and cancer oropharyngeal. According to the American Cancer Society, about 90% of people suffering from mouth or throat cancer have smoked. The risk of cancer increases with the amount of cigarettes smoked and the length of time in which they were smoked.

Excessive consumption of alcohol and drugs destroy the oral and general health, because it increases the risk of malnutrition and addictive.

D. Risk factors determine by the possibility of injuries (traumatic factors)

Lack of protective equipment during sports practice can be the cause of facial trauma.

III. STRATEGIES AND METHODS OF PREVENTION IN ORAL HEALTH

a. The prevention measures at the individual level besides brushing and flossing:

- Decreasing consumption of sugar;
- Balanced nutrition;
- Consumption of fruit and vegetables;
- Giving up smoking and drugs;
- Reducing alcohol consumption.

b. The prevention measures of dentists:

- Application of gels, varnishes, seals, etc.;
- Fluoride supplements individualized;
- Patient education by training parents and children about oral hygiene.

c. The prevention measures at the population level:

- Water, milk, salt fluoridation;
- Toothpaste must contain fluoride;

Launch campaigns to promote health and patient education.

IV. ROMANIA'S ORAL HEALTH STATISTICS IN CORRELATION WITH EUROPEAN COUNTRIES

According to the site http://www.insp.gov.ro/cnepss/wp-content/uploads/2011/11, in 1990, 83% of children in Romania with the age of 6 were affected by caries and in 1995 the percentage reaching 94% for those aged 18 years. National statistics indicates the total number in 2008 to 13.687 dentists, with a ratio of one dentist to 1,573 people. Unfortunately, the rural area of the country is shortage of dentists. However, many people suffer mentally and socially because of the appearance of teeth. Oral health problems lead in time to serious general health problems, such as cardiovascular diseases, gastric ulcer, but also various cancers, etc.

Periodontitis is a gum disease which consists of gum recession. According to a study, 39% of the Romanian don`t know what means

neither this disease nor what are it signs and symptoms. Inflammation of the gums, increased sensitivity to temperature changes, pain or bleeding during brushing are symptoms indicating installation of gingivitis, the first stage of periodontal disease, which is treatable. Unfortunately, the disease is irreversible and it leads to the installation of more serious diseases such as heart disease, respiratory diseases and even vascular accidents.

Some examples, according to the website above, shows the following information provided about the oral health status of the population of member states European Union (EU) compared to the population of Romania:

- 41% of Europeans have natural teeth, while in Romania only 30% of residents have natural teeth.

- Almost 31% of Europeans who don`t have natural teeth wearing a removable prosthesis, while in Romania 14% of respondents said that wearing a removable prosthesis.

- About 15% of Europeans say they have difficulty chewing because of dental problems and for Romania percentage is 32%.

- The vast majority of Europeans (88%) believe that, if needed, they could go to a dentist within 30 minutes away from home or from work. For Romania the percentage is 81%.

- Europeans go to the dentist on average twice a year. Those who have been to the dentist more than three times a year are inhabitants of the land to the East of the EU, namely the citizens of Romania (3.6 times), followed by Lithuania (3.3 times) and then Poland (3, 1 times). On the other hand respondents in Malta (1.7 times) and Ireland (1.8-fold) were at the dentist least twice a year.

- 50% of Europeans respondents said that the last time they visited a dentist was for routine cleaning or treatment. For Romania, the reasons last visit to the dentist was cleaning treatments (27%), routine treatment (31%) and emergency treatments (40%).

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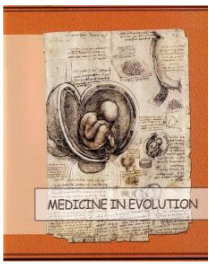
COMMUNICATION THROUGH SOCIAL MEDIA (SOCIAL NETWORKS) IN ORAL HEALTH PROMOTION



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ABSTRACT

Introduction: *Public health and oral health must take advantage of the many social networks, widening their spread around the globe, the increasing number of daily users of such networks, by transmitting educational messages of interest to public health, through the publication of results from studies in which alert people to the actual situation.*

Methods: *We conducted a study over a period of six months retrospective - prospective in which we included 427 adults from urban areas aged between 20 and 35 years. They were sent information on oral health that has used different means of communication, using both traditional and modern means. On social networks to which were connected were sanogenous messages that are sent as video, messages or simple personal and scientific articles.*

Results: *The materials on oral health: 61% preferred YouTube videos, 54.3% preferred personal and scientific articles. Methods information on oral health favorite study group were: online social networks 78.2%, increasing with 65.7% compared to baseline, 67.8% individual dentist down 4.7 % compared to baseline and internet search engines 44.6% increasing by 5.7%.*

Conclusions: *The exploitation of the media is very important in promoting health benefits, taking into account that social networks like Facebook are the preferred mean of communication and information for young adults nowadays.*

Key words: *media, health promotion, social networking, oral health*

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INTRODUCTION

Over the past 20 years the Internet has dramatically changed how individuals access information and communicate. Global Internet use has grown exponentially, with an estimated 5 billion Internet users in 2015, up from 318 million users in 1998 [1]. The Internet is increasingly used for health purposes [2]; one survey reported 83% of American Internet users' source health information online [3]. Numerous Internet-based health interventions have been developed, with several reviews concluding that such interventions generally have positive effects for a range of behaviors [4-7].

Public health and oral health must take advantage of the multitude of social networks, they spread increasingly large world, and the increasing number of daily users of such networks for the transmission of educational messages of interest to improve health and change sanogenetic behaviors.

For two years WHO has implemented programs to promote oral health using social networks and messaging uses for a preventive character and education. Currently they transmit messages related to Ebola disease, its spread and its symptoms. They deliver messages related to Ebola disease, its spread and its symptoms. On September 20, 2014 were 1,666,786 of likes, and on 9 November, 2015 already has 2,537,922 people watching the page. Slowly their number increases, so the impact of health promotion through their Facebook page will have a much greater effect.

Social media can refer to a variety of applications, from exchanging media servers blogging on sites of social networks like Facebook allow users to create networks of friends and acquaintances online [5, 6].

These networks provide the market huge potential as a social network user may view the pages of the site to which the user subscribes. Despite this obvious advantage of social networking sites are not sufficiently exploited in health [7,8].

Various types of applications are adopted by health organizations, relying on the audience, resources and specific objectives [9]. Social media can be used to spread health messages, by providing support in relation to chronic diseases and healthcare consumers connect with healthcare providers [10, 11]. Each type of social media application may respond differently depending on the demographics of the population it can have a unique role and can evolve with modern social media landscape.

The popularity of the current social media combined with its capacity expansion and rapid development, creating opportunities for health promotion and Organizations for Health Promotion, as they must remain in step with current trends of their development and their adaptation to be as fast [12 13]. Therefore this study aims to determine the effectiveness of traditional media and the social media in transmitting messages to promote oral health at the population level.

MATERIAL AND METHODS

I did a study for a period of six months retrospective - prospectively we included 427 adults from urban areas aged between 20 and 35 years. They were sent information on oral health that had been used different means of communication, using both traditional and modern means. I proposed three oral health lessons we used different means of

communication, combining traditional and modern means and transmission of short messages on social networks that were connected every 2-3 weeks. Therefore within education classes held in schools that teach their children watched educational transmitting the same message, but with different approaches:

- PowerPoint presentation with reference to the composition of the oral cavity, dental evolution from the stage of new - born permanent dentition; the role of teeth, how vicious habits may affect the individual's quality of life; how dental caries and oral pathology prevention modalities, including addressing the topic of oral cancer; how proper care of the oral cavity from the stage of infancy to old age;
- Group discussion on oral health, the discussions went in which direction we wanted the audience with small adjustments on my part;
- Watching a documentary on oral health with practicing proper tooth brushing and using dental care aids.
- At the end of lessons education received leaflets and a few references to the websites of oral preventive medicine information.
- I also suggested looking at videos on YouTube.
- Adults as I said were involved four times in projects that make them with their children.
- Some of the recommended materials on social networks: using electric toothbrush film, cavities, oral hygiene and watching Dental TV; recommendation for reading articles.

During statistical analysis we used the following indicators: data nonparametric categories (ordinal and nominal) relative frequencies in percent were calculated because loads are not equal (sex, frequency of tooth brushing, education level, family members, etc.) For parametric data (measurements) were calculated average, standard deviation, minimum and maximum (age) and Chi Square statistical tests, Wilkoxon, t-student test.

RESULTS

The laptop and PC units connected to the internet were common to more than 80% of investigate subject, and the growth in six months was one very small about 6%, the smartphones invasion with internet connection determinates growth a frequency alive surveyed 30%. The increase was statistically significant = 0032 just for using smartphones. The internet connection is customary to 100% of subjects surveyed. Possession of an account on a social network version also is common in case of subjects investigations. On the initial assessment 357 of the 427 subjects had an account on a social network, and at the final 424. The social network were mainly used, Facebook 79.5% and 97.5%, 62.5% Twitter 78%, respectively LinkedIn And 67.5% and 78.3%. Networks Facebook and Twitter should be used to promote oral health, the LinkedIn network promotes your personal skills and a resume should not be associated with the notification center for information on health topics. It was noted that connection on social networks has greatly increased in the last time, on the initial assessment the majority of subjects were connected to it every 2 - 3 days, now over 50% are connected constantly to the version through smart telephony. Over 80% of the investigate subjects shall verify at least daily account on social networks, so this would be a good opportunity to promote oral health by creating attractive pages to give "like" and "follow " then to see the updates on its wall. And if these messages were taked into consideration they should use

"share" or "like", which would mean their friends from the social network can see them.

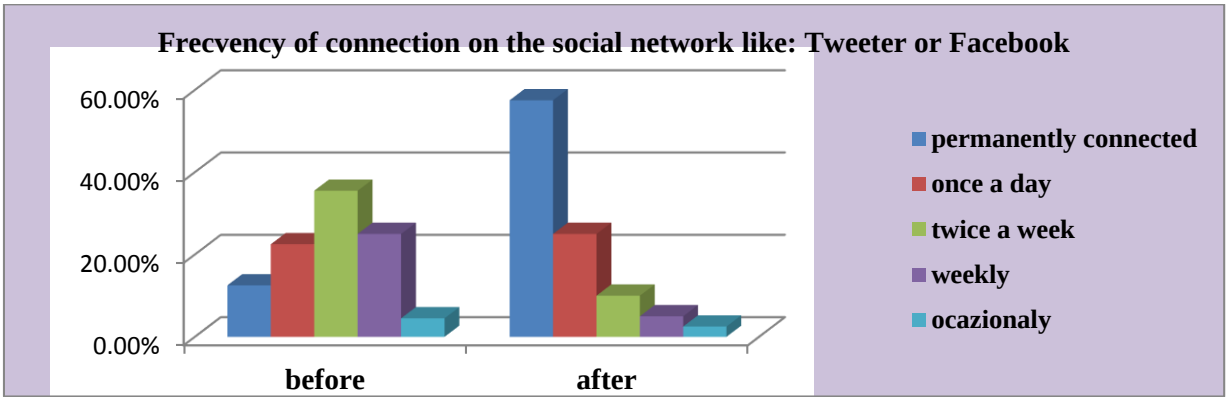

Figure 1. Frecvency of connection on the social network like: Tweeter or Facebook

Groups and games are usually what keeps people interested in social networks, so we can see that the initial assessment about a third of subjects were on no group affiliation, but the final evaluation were still only 4.3% this posture. Increasing membership groups was statistically significant p = 0.05, being statistically significant differences by gender, female subjects aim groups on Facebook, significantly higher. Personal blogs are not necessarily part of the common life of the subjects, only 17.5% say that they have such a blog, but prefer themes related to the mountain walks, cookery or education of children. Blogs have really started to develop in Romania, their place being taken quickly by Twitter, then Facebook social network. Oral health promotion through blog is welcome if it is written by public health doctors or oral dentists willing to bend and work on preventive medicine, not only to curative medicine. Messages written on blogs or articles would be good to promotion through Twitter or Facebook networks most commonly used by the population.

Information on health through the Internet has greatly increased between the two evaluations, if initially claimed that 50% of subjects usually do that today 82% say this. Therefore Public Health strategies should turn to the internet to create a more secure information environment on health, information forums to be coordinated by specialists in the field of interest. On the topic of oral health would be good to expose the effects of neglecting dental problems, proper care of the oral cavity from the stage of newborn to adulthood, even edentulous elderly.

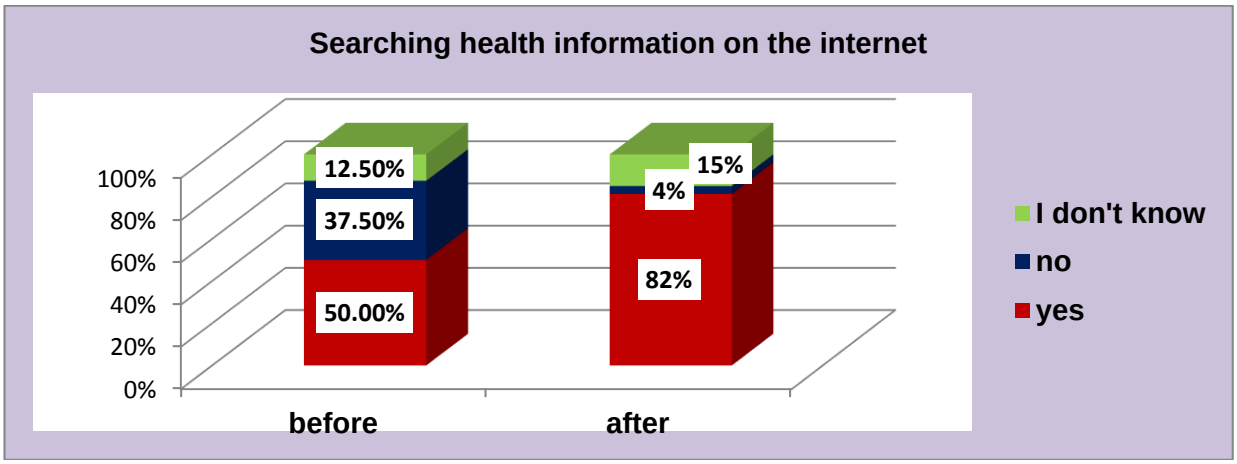

Figure 2. Searching health information on the internet

The initial evaluation of the target group subjects suggest that the manner of searching for health information makes them 55% of randomly through search engines like google, final evaluation seeking for health information that most interests them the first choice through social networks 78.2%, and then turn to search engines 63.9%. In the initial assessment only 17.5% have visited well-known sites and 22.5% on the final evaluation.

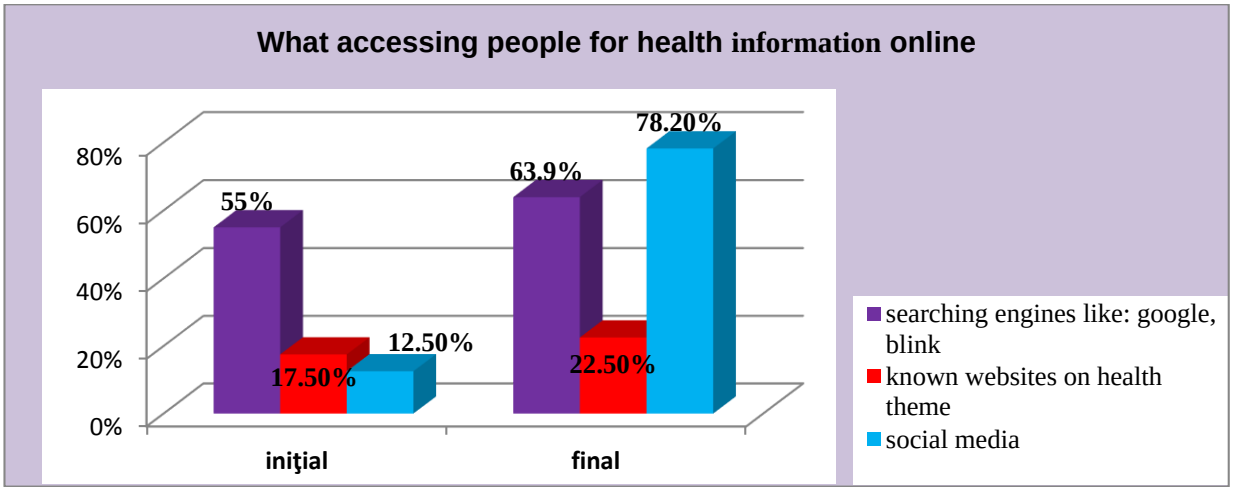

Figure 3. What accessing people for health information online

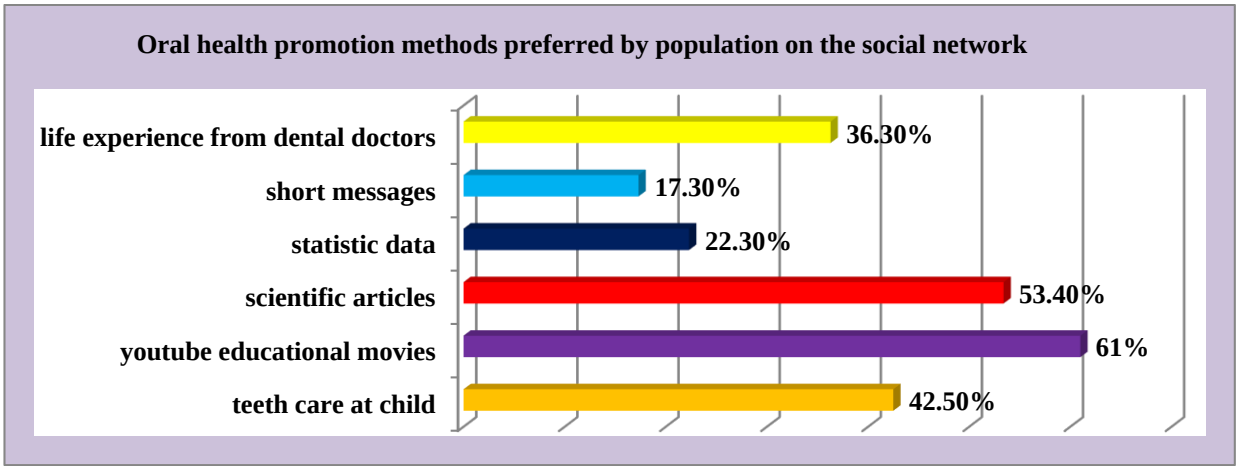

Figure 4. Oral health promotion methods preferred by population on the social network

Information methods on oral health preferred initial assessment were education "one to one" to the dentist, where the environment explains its own problems, the impact on oral health and how to deal with their 72.5%, followed by search engines 33,9%. On final evaluation the rated information methods were considered social networks 78.2%, education to the dentist 67.8%, schools 47.7%, followed by 44.6% the search engines. Therefore we see that social networks have a huge impact to the population. The highest increase was registered by social networks, 65.7%, this increase is statistically significant p = 0.032.

The most prefered materials on oral health were Youtube videos 61%, followed with 54.3% by scientific articles. Methods information on oral health favorite study group were: online social networks 78.2%, increasing with 65.7% compared to baseline, 67.8% individual dentist down 4.7 % compared to baseline and internet search engines 44.6% increasing by 5.7%.

CONCLUSIONS

Social networking sites are now an established part of the online environment; despite being less than ten years old, they are among the most frequently accessed sites globally [14]. While the particular site that is most popular may change over time [15], these sites share common functions that have fundamentally changed how individuals communicate and interact both on- and off-line. Although these sites are primarily used to communicate with social networks, the increasing amount of time individuals spend in these settings [16] suggests that health organizations need to develop effective strategies for reaching individuals in these spaces, whether delivering interventions or using these sites to promote interventions delivered elsewhere. Adults prefer that method of information on health to be conducted online through social media 78.2%, increasing with 65.7% compared to baseline or individual dentist to 67.8% down 4.7% compared to baseline and internet search engines 44.6% increasing by 5.7%. Exploiting the media is very important in promoting health benefit, taking into account that social networks like Facebook are the preferred means of communication and information for young adults nowadays.

Developing health promotion interventions in this setting, and making mistakes and learning from them is certainly far better than doing nothing at all [15,16]. With the continuing change in communications media, health organizations must embrace these technologies or risk being left behind.

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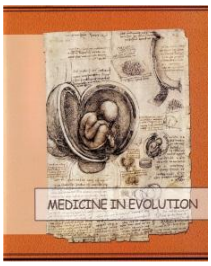
CLINICAL STUDY REGARDING THE EFFECTIVENESS OF FLUORIDE TABLETS



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ABSTRACT

Objective: The aim of this study was to determine the prevalence of caries in a group of school children who underwent general fluoridation.

Method: The study group comprised a total of 38 children with a mean age 7 years who underwent to general fluoridation in the form of tablets starting from their birth or from the age of 6 months. For dental health assessment we used the DMF index for the permanent dentition and the dmf index for the temporary dentition.

Results: The mean DMF and dmf index was 0.53 (standard deviation 0.65) and 2.58 (standard deviation 1.50), respectively.

Conclusions: The present study demonstrates the effectiveness of fluoride tablets administered from birth to 7 years of age in both dentitions. All children participating in the trial received optimal dose of fluoride, corresponding to the current recommendations, and also the administration was correct.

Key words: *fluoride tablets, caries, prevalence*

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INTRODUCTION

Extensively studied in the past 70 years, the use of fluoride in dentistry proved to be one of the most revolutionary and effective measures to globally prevent dental caries (1).

Fluoride is an essential nutrient in the development of healthy bones and teeth, as are calcium, phosphorus and other elements obtained from food and water. When the fluoride content of teeth is increased to an optimum level, particularly at the enamel surface, there is a marked resistance to decay.

For the tooth structure fluoride is obtained in two forms: systemic, ingested during tooth development, and topical, with a local effect at the surface of the erupted teeth. As a systemic nutrient, fluoride is available in the drinking tap water, either naturally or by artificial fluoridation, also in prescribed food supplements or in small quantities in certain foods (2).

The effectiveness of fluoride tablets is demonstrated by numerous studies both in temporary and permanent dentition, and the reduction of caries index ranges between 40-80% for both dentures, depending on the age at which the therapy is started, duration of treatment, and especially the way of administration of fluoridated tablets (by chewing or swallowing) (3).

OBJECTIVES

The aim of this study was to determine the incidence of caries in a group of first year elementary school children, who underwent general fluoridation with fluoride tablets.

MATERIAL AND METHODS

The screening took place over a period of 8 months and included a total of 38 children in Tirgu Mures. The study sample was selected using the following inclusion criteria:

- Children attending urban schools without making any difference in terms of social-economic conditions or belonging to ethnic or religious groups;
- The average biological age of participants - 7 years of age, ranging between 6 and 8 years;
- The systemic use of fluoride tablets.

The subjects involved in the study were minors, so the informed consent was signed by the parents of participants. The research obtained the ethical approval from the Research Ethics Committee of the University of Medicine and Pharmacy of Tirgu Mures.

Children involved in the study were using fluoride tablets starting from their birth or from the eruption of their first tooth (approximately at the age of 6 months) and in two cases the mother also used fluoride tablets during pregnancy. The active ingredient of the used products was sodium fluoride and according to the answers given by the parents the tablets were properly administered. The dose of fluoride used from birth to the age of two years was of 0.25 mg fluoride, between 2 and 3 years of 0.50 mg, between 4 and 5 years of 0.75 mg and after 6 years 1 mg of fluoride per day. Mothers used 1 mg of fluoride per day during pregnancy. All children dissolved the tablet in their mouth or chewed it well before swallowing.

For the assessment of dental health of the subjects the dmf index was used in the primary dentition and the DMF index in the permanent dentition.

During clinical examination performed at the Department of Preventive and Community Dentistry, Faculty of Dentistry of Tirgu Mures, all children involved in the study received training on maintaining proper dental

hygiene, with the use of demonstrating models.

All these children's parents were informed about the dental status of children and their treatment needs.

Statistical analysis

Statistical processing was performed using Microsoft Excel program and Eviews 5.1, and for comparing the means of two independent populations the Student's t test was applied. The level of statistical significance was chosen at $\alpha = 0.1$, which means that the confidence level was 90% according to the formula: $C = (1-\alpha)\ 100$. The confidence level of 90% indicates that there is a 90% probability the population mean parameter lies within the interval and a 10% chance of beeing without these limits. The results were considered statistically significant if p was $\leq \alpha$, thus $p \leq 0.1$.

RESULTS

Out of the 38 children 21 were free from caries, representing a percentage of 55.26%.

In temporary dentition dmf index showed a value of 2.58, with a standard deviation of 1.50, with the following components:

d component = 1.82; std dev = 1.16;

m component= 0.08; std dev = 0.27;

f component = 0.68; std dev = 0.53;

In permanent dentition DMF index achieved a value of 0.53, with a standard deviation of 0.65 and the following components:

D component = 0.39; std dev = 0.49;

M component = 0;

F component = 0.13; std dev = 0.65.

The global DMF index value was 3.11, with a standard deviation of ±1.50.

We found that the DMF index values were based on the first permanent molars; central incisors were not affected by caries.

DISCUSSIONS

To evaluate the effectiveness of the fluoride tablets we compared the caries experience of the present study with that obtained in a previous investigation which aimed to determine the caries experience in a group of children with the same inclusion criteria, except the use of systemic fluoride (4).

Thus, we found that in the group that received fluoride through tablets a higher percentage of children were caries free (55.26%) than in the group with no systemic fluoridation (14.28%). While in the group of non-fluoridated children the dmf and DMF indices were 4.81 and 0.92, respectively, in the present study the caries experience is was smaller – dmf being of 2.58 and DMF of 0.53, both values confirming the effectiveness of fluoride tablets in preventing tooth decay.

Table I. *Comparison of indices between the group of non-fluoridated children and the group that received systemic fluoride therapy*

Indice	Non-fluoridated group		Fluoridated group		p value
	Arithmetic mean	±Standard deviation	Arithmetic mean	±Standard deviation	
Dmf	4.81	1.05	2.58	1.39	<0.001
DMF	0.92	1.05	0.53	0.65	0.04
Global DMF	5.73	3.40	3.11	1.50	<0.001

Comparing the results of the two groups, statistically significant differences were found both in temporary dentition ($p < 0.001$) and in permanent dentition ($p = 0.04$). Comparing the global DMF indices of the two groups, the differences were also statistically significant, p value being less than 0.001.

In the present study we found a 46.57% reduction of dmf and of 38.05% of DMF index in children who underwent fluoride therapy with tablets compared to the previously studied group of children who did not receive any systemic fluoride supplementation.

Comparing our results with those found in the literature we found that they were consistent with most investigations performed for the same purpose. Margolis et al demonstrated a 76% reduction of dmf index after administering fluoridated tablets (with 0.5 to 1 mg of fluoride) immediately after birth, and for a period of 4-6 years (5). In his study Schumannsky administered fluoride tablets starting from birth to the age of 9 and he reported a reduction of 39% of DMF index (6).

Although the efficiency of systemically administered fluoride is well documented, there are studies that found no caries reduction (7), and others sustaining that the efficiency of fluoridated tablets is limited and the key factor of their effectiveness is patient compliance (8).

Several studies in the literature are dealing with the issue of dental fluorosis when using these fluoride supplements, emphasizing the importance of proper fluoride dosage in order to prevent such problems (9), and also the difficulty to achieve this, considering the multiple factors that may be more or less known (10). However, other papers conclude that the use of fluoride tablets do not increase the prevalence of dental fluorosis (11). Our study did not focus on dental fluorosis due to the young age of the children included in the research and therefore the incidence of fluorosis could not be appreciated.

The use of fluoride tablets is controversial partly because of the risk of their side effects and secondly due to the evidence that shows that the effect of fluorides is mainly the result of the chemical reaction that occurs at the enamel surface. Therefore it is recommended to dissolve and to chew well the tablet before swallowing it. For this reason, the newer studies focus more on fluoridated toothpastes, gels, varnishes and oral rinses. Although these investigations also admit the effectiveness of fluoride tablets, they demonstrate the same prophylactic results whit the use of varnishes but with less systemic risks (12).

CONCLUSIONS

1. The present study demonstrates the effectiveness of fluoride tablets systemically administered from birth to the average age of 7 years in both temporary and permanent dentition.
2. All children who participated in the trial received proper doses of fluoride, corresponding to the current recommendations and also the administration was correct (the tablets being chewed and dissolved before swallowing).

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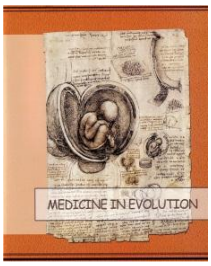
PREVALENCE OF OCCUPATIONAL HEALTH PROBLEMS AMONG A GROUP OF DENTAL PRACTITIONERS



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ABSTRACT

Objective: the study aimed to assess the prevalence and the nature of some occupational health problems among practicing dentists in Mures County, Romania.

Material and method: A cross-sectional study was conducted using a self-reported questionnaire which was distributed among dentists working in Mures County.

Results: Out of the 308 dentists 285 completed the survey. The most common occupational problems were musculoskeletal disorders (87.36%), followed by injuries from sharp instruments (53.33%), allergies (33.68%), hearing problems (30.52%), and eye problems (29.82%). Although three quarters of the participants considered dentistry as being a stressful profession, most of them were satisfied with their job.

Conclusions: The prevalence of occupational problems among the participant dentists was high and their knowledge of occupational health and safety was inadequate

Key words: *occupational hazards, dentist, health risks, musculoskeletal disorders*

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INTRODUCTION

Every profession exposes workers to chronic conditions and situations that may have an impact on overall health. Despite numerous technical advances in recent years, dentistry still involves several techniques and materials that can result in health issues. Previous studies suggest that a wide variety of occupational risks exist in dental practice, such as exposure to infectious diseases, radiation, dental materials, noise; musculoskeletal disorders, dermatitis and respiratory disorders; eye injuries; psychological problems (1, 2, 3).

OBJECTIVES

The aim of the study was to assess the prevalence and the nature of some occupational health problems among practicing dentists in Mures County, Romania.

MATERIAL AND METHODS

A cross-sectional study was performed using a questionnaire distributed to dental practitioners working in Mures County. The survey was designed to record demographic data, information about different types of occupational health problems experienced by the respondents and the knowledge of the safety precautions they took. In total 308 dentists were requested to fill up the questionnaire and collection of data was carried out over a 5-week period. The participants were questioned about their gender, age, years of practice, weekly working hours and the average number of patients during a week. The next set of questions addressed various occupations hazard encountered by the subjects, such as injuries form sharp instruments, musculoskeletal disorders, hearing problems, eye injuries and allergies. Next, questions were asked on following of different cross infection control measures in the office/clinic. The next part of survey contained questions related to the use of X-ray and the available protective measures. Finally, dentists were requested to assess their job related satisfaction and stress and its managements through different relaxing activities.

Data analysis was performed using frequency tables containing absolute and percentage values to display the responses of the dentists.

RESULTS

A total of 285 out of 308 dentists completed the questionnaire and the response rate was 92.53%. 138 (48.42%) of them were males and 147 (51.58%) were females, and the mean age of participants was 39.5 years (range between 25 and 68 years). 128 dentists (44.91%) were working in a rural area, whereas 157 (55.09%) were from urban areas. Table I reveals the practical experience of the respondents, the average number of working hours per week and the average weekly number of patients treated by the practitioners.

Table I. *Years of clinical practice and weekly workload of the participants*

Frequency	**Clinical practice (years)**				**Weekly working hours**		**Number of patients/week**		
	<5	5-10	10-20	>20	< 30	>30	<30	30-35	>35
Number	56	72	69	88	169	116	93	132	60
Percentage	19.65%	25.26 %	24.21%	30.87%	59.30%	40.70%	32.63%	46.31%	21.05%

Most participants were experienced, with a clinical practice over 5 years, were working less than 30 hours per week and were treating between 30 and 35 patients during a week.

The most common occupational problems were musculoskeletal disorders (87.36%), followed by injuries from sharp instruments (53.33%), allergies (33.68%), hearing problems (30.52%), and eye problems (29.82%).

Among the encountered musculoskeletal problems the participants indicated the lower back pain as being the most common disorder, followed by cervical spondylolysis, hand/wrist pain, ankle/foot pain, limb numbness and myofascial pain.

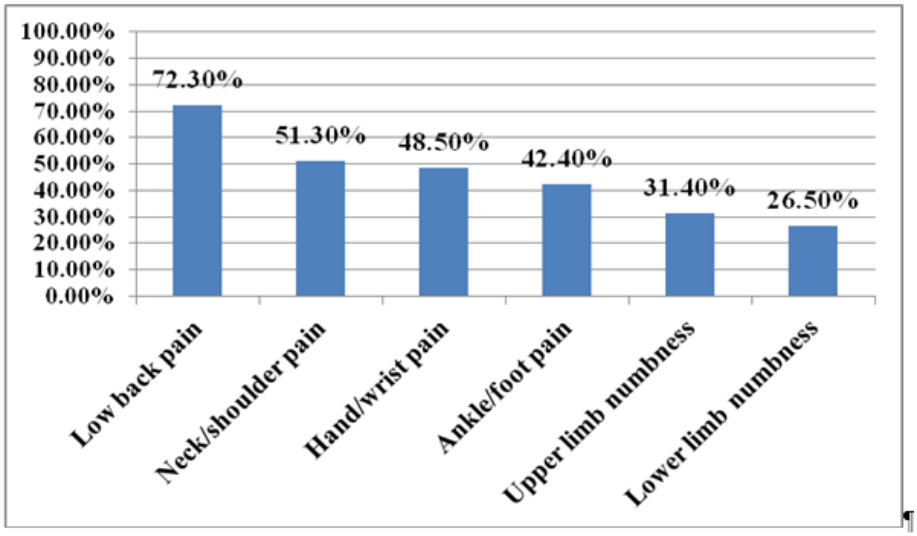

Figure 1. Distribution of musculoskeletal complaints among affected dentists

When asked about the types of injuries from sharps, the most common incident was represented by dental probe prick (49.05%), followed by needle stick injuries (46.44%), root canal files (29.72%), dental burs (27.30%), scalers (18.25%) and other sharps (Figure 2).

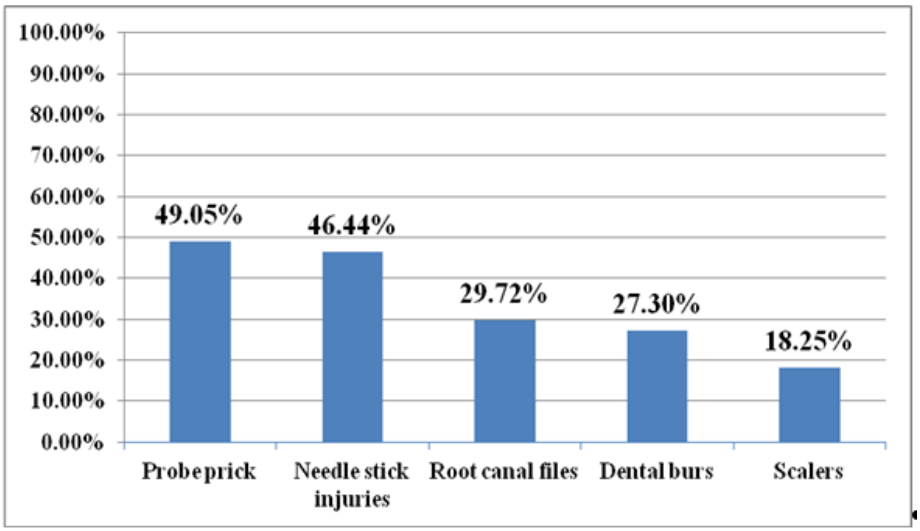

Figure 2. The most common types of injuries suffered by study participants

Unfortunately, 88.80% of the affected practitioners did not receive any post-exposure prophylactic treatment after the injury.

About one quarter of participants (24.21%) were using X-ray equipment, but majority among them (84.05%)

were not using any type of devices to measure radiation exposure (Table II).

Table II. *The wear of radiation monitoring devices among dentists using X-ray equipment*

	All participants	Dentists performing X-rays	Dentists wearing dosimeters	Dentists without dosimeters
Number	285	69	11	58
Percentage	100%	24.21%	15.94%	84.06%

Most allergies were reported by female dentists and were related to latex gloves, disinfecting solutions, and one or more dental materials (Figure 3). Most allergic reactions occurred in the form of contact dermatitis, panaritium and irritative dermatitis.

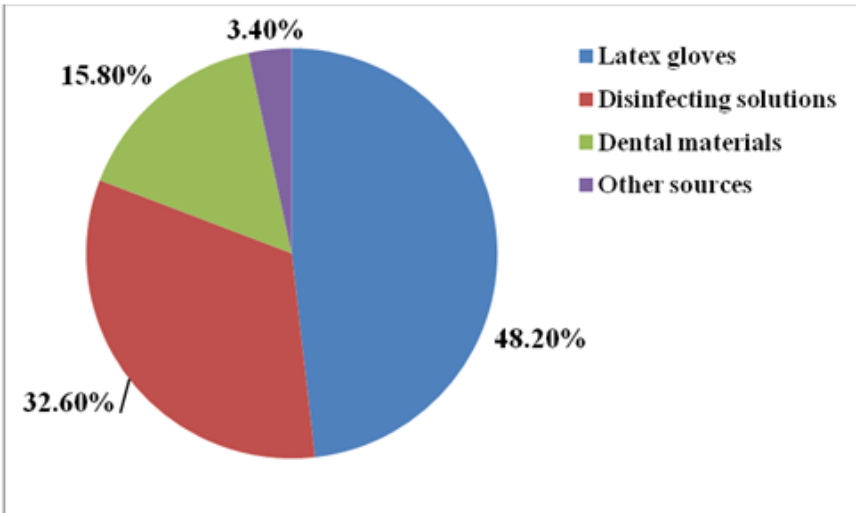

Figure 3. Sources of allergic reactions among participant dentists

Three quarters (75.43%) of the participants responded positively when asked about job related stress. Just around a quarter of subjects (23.85%) were taking holidays every 6 months and most of them (65.26%) had their holiday once in a year, while the rest of them more rarely. Only one third of the participants were involved in regular physical activities and sports as a method for stress management and relaxation and most of them (78.94%) were male dentists.

Finally, a reasonably high percentage of dentists (91.22%) were satisfied with their current job and working conditions.

DISCUSSIONS

The present survey aimed to assess the prevalence of occupational hazards among practicing dentists and the status of different applicable preventive measures. Out of the 308 dentists 285 participated to this study and the response rate of 92.53% can be considered satisfactory. The other 23 practitioners who refused to complete the questionnaire claimed to have a very busy schedule.

During dental procedures the dentist's position is strained, which in combination with various repetitive movements and prolonged postures such as sitting and standing can lead to musculoskeletal system trauma. Musculoskeletal symptoms among dentists are highly prevalent and well documented (4, 5, 6). Most respondents (87.36%) reported at least one symptom of musculoskeletal disorders during their career and a significantly high

number of subjects (51.92%) indicated the presence of two or more simultaneous musculoskeletal complaints (lower back pain associated with neck/shoulder complaints and hand/wrist pain). The present study indicates back pain is the most common complaint of the respondents, followed by neck/shoulder pain and hand/wrist pain. This result is consistent with most previous investigations that consistently report that back pain is the most frequent musculoskeletal complaint among dentists (7, 8, 9). However, the frequency of back pain syndrome was higher than in most other studies (10, 11, 12, 13, 14). Lower back pain was present even in younger dentists and its incidence increased with greater physical workload (especially in dentists working over 30 hours/week or treating over 35 patients per week).

Occupational hand dermatoses are not exclusively related to latex allergy, but allergy to latex gloves is the most commonly reported cause of dermatitis. Skin problems may also result from exposure to various dental and chemical materials, such as acrylates and aldehydes. Potential allergens and irritant agents used in dentistry have also been described in previous investigations (15). Over one third (33.68%) of the survey participants were suffering from allergies and this percentage is higher than the average prevalence found in other studies (16, 17).

Dental practitioners can be exposed to pathogenic microorganisms including streptococci, staphylococci, HBV, HCV, HIV, herpes simplex virus, cytomegalovirus, Mycobacterium tuberculosis and other germs from the oral cavity and respiratory tract of their patients. Lesions produced by sharp instruments could be a source of transmission of various infectious agents (18). In the present study 53.33% of the dentists have a positive history of such injuries. Despite the high prevalence of injuries from sharp instruments, most of the affected practitioners did not receive any post-exposure prophylactic therapy. Hence, the participants of the survey were exposed to a relatively high risk of infection during their clinical practice.

Job related stress among dental practitioners is deemed to result from many sources including working hours, job satisfaction, business income, threat of malpractice and interactions with patients (19, 20, 21). Most clinicians reporting a high level of stress were working over 30 hours per week, providing dental treatment for more than 35 patients during a week. Although reduced working hours and regular sport activities were correlated to a lower job related stress, two thirds of the study participants embraced a sedentary lifestyle.

CONCLUSIONS

The study revealed that the prevalence of occupational problems among the participant dentists was high and their knowledge of occupational health and safety was inadequate. Therefore, continuing dental education programs with more preventive strategies are needed to improve the knowledge of dentists regarding these hazards and their prevention.

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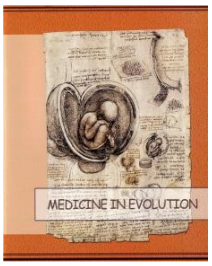
A NEW SUBSTITUTE TO FREE GINGIVAL GRAFT IN AUGMENTATION OF GINGIVAL KERATINISED TISSUE.



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ABSTRACT

The correlation between the presence of a keratinized gingival layer of a certain width and the conservation of periodontal health has been debated through the years by a big number of clinical studies [1,2], and had raised quite a few controversies [3]. As a result of these debates it was considered that a certain amount of keratinized tissue has been considered necessary to maintain periodontal health and to prevent gingival recession. So it was also concluded by some authors that for the maintenance of gingival health 2 mm of keratinized gingiva is adequate however this still remains controversial. Since the „golden standard" method of treatment is represented by the use of a free gingival graft (a procedure that is difficult and require a second surgical site nedeed for graft harvest) it was important to find and alternative procedure that can acomplish the same sustainable and predictible results as the „golden standard". Lately a new collagen matrix GeistlichMucograft® was researched and the treatment results when using it are promising. However there are not enough clinical trials to demonstrate that this matrix can deliver the results required in order to substitute the current „golden standard".

MATERIAL AND METHOD: A search for clinical trials on treatment of gingival recessions using Geistlich Mucograft®was started on Internet. Any case series, cohort study, CCT and RCT with at least five patients was included. From the articles found concerning the treatment of gingival recession only 12 was related to the use of mucograft. Only 6 of the 22 found folowed the increase in width of keratinized tissue and had at least a 12 month folow up period. The primary outcome variable was the increase in witdth of keratinized tissue. Due to the heterogenity of the studies no meta-analyses could be performed.

RESULTS: The studies show an increase in the keratinized tissue width, which range from a minimum of 1,34 mm [4] measured at 60 days post surgery to a maximum of 2,76 [5]. At one-year post surgery the dimension ranged from 1,23 mm [6] to 2,45 mm [7].

CONCLUSIONS: The results proved that Geistlich Mucograft® is as effective and predictable as CTG regarding the creation of a band of keratinized tissue, and it is associated with a lower patient morbidity then CTG+CAF.

Key words: *collagen membrane, gingal recession, connective tissue graft*

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INTRODUCTION

The aim of the gingival recession treatment is the complete restoration of the muco-gingival complex anatomy and the regeneration of the attachment apparatus of the tooth, including cementum with inserting connective tissue fibers, and alveolar bone on previously exposed root surfaces. In order to achieve this is important to obtain an increased layer of keratinized gingival tissue. Even if the question if there is a need for keratinized tissue to maintain periodontal health around teeth and peri-implant health around dental implants has not been responded yet and it is still open for debate, plastic periodontal procedures to augment keratinized tissue and to increase soft tissue volume are well described [8].

Recent studies have shown a positive correlation betwen lack or presence of minimal amounts of KM and mucosa recession [9] and has concluded that a wider zone of keratinized mucosa may better preserve soft and hard tissue stability and may be more favourable for long-term maintenance of dental implants and in contrast a smaller zone can results in poorer oarl hygiene and greater soft tissue recession.

The correlation between the existence of a gingival keratinized layer of a certain size and the conservation of periodontal health has been debated through the years by a big number of clinical studies [1,2,], which have raised quite a few controversies [3].

Some authors claimed that for the maintenance of gingival health a 2 mm of keratinized gingiva is adequate however this still remains controversial.

Currently the "golden standard" for enhancing the keratinized tissue width is represented by connective tissue graft plus coronal advanced flap (CTG+CAF). However this surgical technique is time consuming, can have a high morbidity because of its needs for a second surgical site that creates patient discomfort. Also the second donor site presents only a limited supply of donor tissue. Because of this reasons the search of a material that can substitute the connective tissue graft has never stopped.

In past a variety of materials and procedure (biologic substitutes, non-absorbable and absorbable barrier membranes) has been tried in order to replace CTG+CAF. Neither of the materials used on those methods has been able to achieve the desired width of the keratinized tissue in a stable predictable and sustainable way and providing at the same time results that were satisfactory from an aesthetic point of view.

Since contraoversy still exists with respect to the efficacity of soft tissue augmentation it is imperative that new materials to continue to be evaluated in the search of a viable replacemtn of CTG+CAF.

Recently a new two-layer, xenogeneic collagen matrix has appeared on the market and promise to replace the "gold standard" in terms of results. Geistlich Mucograft® is an innovative "off-the-shelf" 3D collagen matrix designed for soft-tissue regeneration. It has been designed to avoid painful autogenously soft-tissue grafts (both, connective tissue grafts (CTG), and free gingival grafts (FGG)) and increase patient satisfaction.

Figure 1. GeistlichMucograft® membrane

The matrix is made of type I and type III collagen without further cross-linking or chemical treatment. The collagen is extracted from a veterinary certified porcine source and is carefully purified to avoid antigenic reactions. The collagen is processed into a bilayer matrix with one side being a thin, smooth and low-porosity compact layer (CL) and the other a more porous three-dimensional spongy layer (SL).

It has a dense structure consisting of collagen fibers in a compact arrangement. The dense compact structure allows tissue adherence and is a prerequisite for favorable wound healing. This structure is designed to give GMG structural integrity and has a smooth texture with appropriate elastic properties to accommodate suturing.

The inner spongy scaffold (2.5-5.0mm) is specifically designed to add volume to GMG and to allow soft-tissue ingrowth. The spongy scaffold of GMG is rapidly colonized by soft-tissue cells, and serves at the same time as a space maker for soft-tissue regeneration.

The porous structure of GMG is thick in order to achieve thicker peri-implant keratinized gingival tissue (KT), by means of the space-making effect, and to favor blood clot formation. This structure is derived from porcine skin, allows tissue adherence favoring wound healing and promoting cell integration. The porosity is obtained through defined parameters and a controlled lyophilization process. The volume fraction of pores in the matrix is 90% and the size distribution for these pores ranges from 5 to 200 µm, with smaller pores being primarily located on the compact layer and larger pores found in the spongy layer. This side is turned toward the bone defect and/or soft tissue to encourage bone-forming cells and tissue growth and to stabilize the blood clot.

This spongy structure readily absorbs fluid facilitating organization of the blood clot, promoting formation of new blood vessels, and allowing for tissue integration within the matrix.

Both layers are combined through a biophysical interweaving process without any chemical manipulation. The volume fraction of pores in the matrix is 90% and the size distribution for these pores ranges from 5 to 200 µm, with smaller pores being primarily located on the compact layer and larger pores found in the spongy layer.

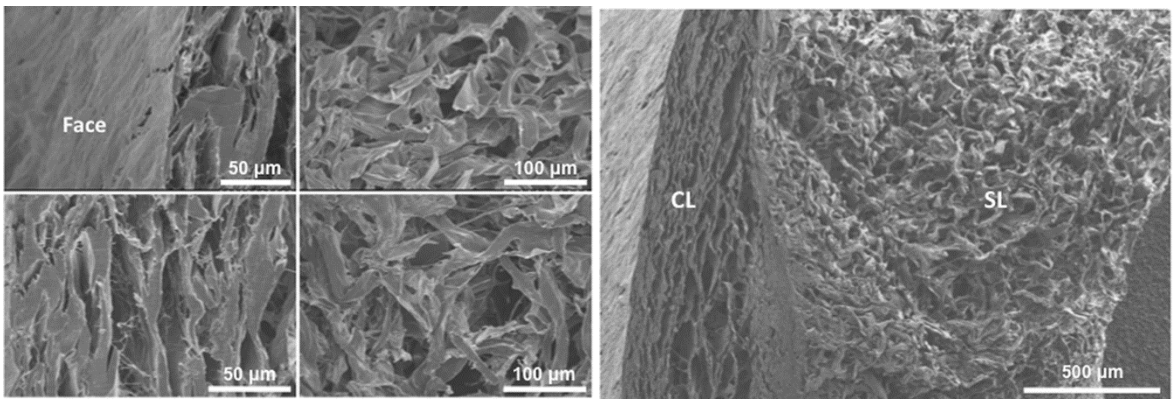

Figure 2. Scanning electron microscopy of the MG scaffold, showing a low magnification cross section (A). In addition, the face (B, left) and cross-section (C) of the low-porosity compact layer of this scaffold is shown, along with the face (D) and cross-section of the more porous spongy layer (E). CL = compact layer and SL = spongy layer. (Ghanaati 2011)

MATERIAL AND METHOD

In order to demonstrate the efficiency of this membrane, a search through international literature has been started that revealed a number of 78 scientific papers. The search was conducted through Pubmed (a total of 9 scientific papers was found) and google scholar (78 scientific papers were found).

HAND SEARCH

Hand searching (D.H, P.M., S.R.) was performed on relevant journals (European Journal of Esthetic Dentistry, International Journal of Periodontics and Restorative Dentistry, Journal of Clinical Periodontology, Journal of Esthetic and Restorative Dentistry, Journal of Periodontology, Quintessence International, American Journal of Esthetic Dentistry) up to August 2014, and also bibliographies of all retrieved papers and review articles were searched.

The search was made to include any case series, cohort study CCT and RCT with a least five patients. The reported treatment outcomes has to include either clinical and/or histological measurment of the witdh of kerrinized mucosa.

From the 78 scientific papers found only 22 adress the use of mucograft for improving the wittdh of keratinized gingival tissue. Six of those studied the improvement of KM witdh around tooth and one around dental implants.

From those 22 scientific papers only 6 adress clinical studies regarding the efficiency of mucograft evaluating the increase width of keratinized tissue with a folow up of at least 6 months after the surgical intervention has been done.

The studies was undertaken on a population of 100 pacients (male and female) and the primary outcome variable studied was the increase in witdth of keratinized tissue. The secondary outcome variables studied were complete root coverage (CRC), recession reduction, root coverage and aesthetic satisfaction.

The surgical technique involve the creation of an coronally advanced flap (full thickness trapezoidal flap) folowed by the debridment of the exposed root areas. After the Geistlich Mucograft® is trimmed to match the desire dimension it is inserted and adapted to the area. Finally the gingiva is sutured carefuly so the suture doe not pass through the matrix.

After 2 weeks, the sutures were removed. During the first 3 weeks, the patients did not perform any mechanical tooth cleaning. The patients used a prescribed 0,12% chlorhexidine mputhrinse twice a day. After 3 weeks, patients started to brush the treated teeth using a soft toothbrush and the roll technique [7]. At 3, 6 and 12 months, the patients were recalled for follow-up visits. The same measurments taken at the baseline were repeated at 6 and 12 months.

Evaluating subject-reported outcomes of pain or discomfort, esthetics, and consequent treatment prefernce, this method not only avoided the morbidity of donor graft harvest but also presented color and texture scores equivalent to the CTG+CAF. Overall subject reported esthetic satisfaction.

RESULTS

All the studies show an increase in the keratinized tissue width, which range from a minimum of 1,34 mm [4] measured at 6 months post surgery to a maximum by 2,8 (Herford 2010). At one-year post surgery the gained width ranged from 1,11 mm [4] to 4 mm [10] followed 2,45 mm [7]. However both studies has a low number of patients (Dominiak et al. 7 patients and Rotuno et al. 3) so the number can be inaccurate especially since studies on larger populations (Jepsen et al. on 45 patients) has shown an increase of only 0.93 mm after 6 months.

Nr.	Author	Study Population	Increase in keratinized tissue witdh after 6 months	Increase in keratinized tissue witdh after 12 months
1	McGuire M. Et al.	25	1,34 mm	1,11 test sites
2	Sanz et al.	20	2,5 mm	NA
3	Rotundo et al.	3	NA	2,45 mm
4	Herford et al.	30	2,8 mm	NA
5	Nevins et al.	5	NA	2,3±1,1 test sites
6	Cardaropoli et al.	18	NA	1,23±0,61 test sites
7	Dominiak et al.	7	NA	4 mm
8	Jepsen et. al.	45	0.93	N.A.

DISCUSSIONS

All the studies had demonstrate a statistically significant amount of keratinized tissue achieved with both surgical procedures, the CTG and CM. Also they had shown, that even if the measures between the sites that was treated with free gingival graft ant those treated with Geistlich Mucograft® were different, from a statistical point of view was balanced with subject-reported outcomes [4]. Also the majorityof the studies has achieved a thickness of 2 mm KM after 2 years whish is considered enough for a healthy peridontium. Even if in some clinical studies has shown that using free gingival graft a thickness of more than 2 mm can be achieved the literature hasn`t recorded at the current time any beneficial effects of having a layer of KM thicker than 2 mm. The use of Mucograft® for augmenting the band of keratinized tissue around prosthetic abutments rendered similar results when compared with the golden standard [11]. The clinical studies also demonstrated that using Geistlich Mucograft® lead to more consistent results then other studies that tried a different type of membrane. Different clinical studies showed almost identical results when using the same materials, clinical indications and surgical procedure even though one

study was about studying the KM around prosthodontics abutments and the other dental implants [5,11].

CONCLUSIONS

In conclusion we can say that all the studies had demonstrated that the use of GeistlichMucograft®, when used as a soft tissue substitute aiming to increase the width of keratinized mucosa around tooth was as effective and predictable as the connective tissue auto-graft but its use was associated with a significantly lower patient morbidity.

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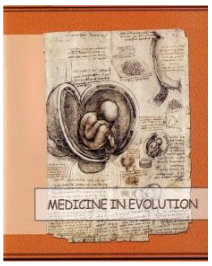
NEW VERSUS OLD IN SURGICAL TREATMENT OF GINGIVAL RECESSION DEFECTS.



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ABSTRACT

Introduction. *The treatment of gingival recessions is a common requirement due to aesthetic concern or root sensitivity. The aim of the gingival recession treatment is the complete restoration of the mucogingival complex anatomy and the regeneration of the attachment apparatus of the tooth, including cementum with inserting connective tissue fibers, and alveolar bone on previously exposed root surfaces. The aim of this paper is to systematically review the literature on coronally advanced flap (CAF) alone or in combination with tissue grafts or barrier membranes (BM), used in the gingival recession treatment in order to determine witch method of treatment can produce the best predictable and sustainable results.*

Material and method. *A search for randomized clinical trials on treatment of Miller Class I and II gingival recessions was started on Pubmed. From the articles found concerning the treatment of gingival recession (2507) 129 articles were related to the use of CAF and 68 were related with the use of BM (55 resorbable membranes and 13 non-resorbable membranes) in the treatment of the gingival recession. We selected only those with at least 6 months of follow-up. The primary outcome variable was complete root coverage (CRC). The secondary outcome variables were recession reduction, clinical attachment gain, keratinized tissue gain, aesthetic satisfaction, root sensitivity, post-operative patient pain and complications.*

Results. *CAF was associated with mean recession reduction and CRC. Connective tissue grafts associated with CAF were statistically significantly superior to CAF alone or CAF plus guided tissue regeneration in CRC.*

Conclusions. *CTG or GTR and BM in conjunction with CAF enhance the probability of obtaining CRC in Miller Class gingival recessions.*

Key words: *coronally advanced flap, soft tissue grafts, barrier membranes, gingival recession*

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INTRODUCTION

Gingival recession is defined as the progressive exposure of root surface resulted due to migration of gingival margin and epithelial insertion towards the apex of the tooth. From a histological point of view this destruction is closely related to the mechanical forces involved or with the inflammatory periodontal disease. The forces involved lead to a resorption of alveolar bone and periodontal ligament and those the exposure of the root surface to the oral environment will result as a consequence.

The most common classification used when dealing with the gingival recession is the one that Miller proposed in 1985 and which described four classes of marginal tissue recessions based on both the level of gingival margin with respect to the mucogingival junction and the underlying alveolar bone.

In class I, the recession did not extend to the MGJ, while in class II the gingival margin reached MGJ, both showing no loss of interproximal bone. In the class III recession defect, the gingival margin was located to or beyond the MGJ with interproximal bone loss and/or tooth malpositioning. Finally, class IV showed serious interproximal bone loss and/or severe tooth malpositioning. Clinical variables involved in gingival recession might also be evaluated for anticipating a possible prognosis of root coverage outcomes.

Because of the clinical aspect and the symptomatology described above it is important to established a method of treatment that can produce predictable and sustainable results and which can fix the gingival recession from both points of view (aesthetic and functional).

Gingival recession defects may be treated by a number of procedures including rotational and advanced gingival flaps, free gingival or connective tissue grafts, and by applying principles for guided tissue regeneration (GTR) [1].

The aim of the gingival recession treatment is the complete restoration of the mucogingival complex anatomy and the regeneration of the attachment apparatus of the tooth, including cementum with inserting connective tissue fibers, and alveolar bone on previously exposed root surfaces [2]. It is important to achieve an increase layer of keratinized gingival tissue. The keratinized gum is a specialized mucosa covered by keratin or parakeratin and includes both the free and the attached gum. It extends from the gingival margin to the mucogingival junction and has a dimension which varied from 1 to 9 mm depending on a different number of factors (age of the subject, tooth location and position).

The correlation between the existence of a gingival keratinized layer of a certain size and the conservation of periodontal health has been debated through the years by many clinical studies [3], which have raised quite a few controversies.

Because of this it has been considered that a certain amount of keratinized tissue has been considered necessary to maintain periodontal health and to prevent gingival recession. So it was also concluded by some authors that for the maintenance of gingival health 2 mm of keratinized gingiva are adequate, however this still remains controversial, and so the decision to augment the width of keratinized gingiva around dental implants and teeth still depends on the doctor.

The materials used in the surgical treatment include autografts, xenogenic or allogenic materials each of which has their own advantages and disadvantages. Tissue engineered replacement skin has also been used.

MATERIAL AND METHODS

A search for randomized clinical trials on treatment of Miller Class I and II gingival recessions was started on Pubmed. From the articles found concerning the treatment of gingival recession (2507) 129 articles were related to the use of CAF and 68 were related with the use of BM (55 resorbable membranes and 13 non-resorbable membranes) in the treatment of the gingival recession. We selected only those with at least 6 months of follow-up. The primary outcome variable was complete root coverage (CRC). The secondary outcome variables were recession reduction, clinical attachment gain, keratinized tissue gain, aesthetic satisfaction, root sensitivity, post-operative patient pain and complications.

RESULTS

Treatment of gingival recession using a coronaly advanced flap

The most common approach for the gingival recession treatment is the creation of a coronally advanced flap (CAF). This procedure is based on the coronal shift of the soft tissues on the exposed root surface [4] and may be used alone or in combination with soft tissue grafts [5], enamel matrix derivative (EMD), acellular dermal matrix (ADM), platelet-rich plasma (PRP) and living tissue-engineered human fibroblast derived dermal substitute (HF-DDS).

It has been suggested that coronal displacement of the flap may support periodontal regeneration by extending the period during which periodontal ligament cells can form new attachment along the root surface without interference from the gingival epithelium [6]. Although proven effective as root coverage procedures, the coronally advanced flaps lead to limited or no periodontal regeneration in gingival defects [5].

In conclusion the coronally positioned flap procedure offers a simple and reliable treatment alternative as a root coverage procedure in Class I and Class II recession type defects [7]. The long-term outcome stability seems to be critically dependent on a continuous follow-up program with re-instruction in non-traumatic brushing habits.

Table 1. *Mean root coverage and complete root coverage (%) with coronally advanced flap technique. (modified after Zucchelli&Mounssif 2015)*

Study	Surgical technique used	Mean root coverage (%)	Total root coverage (%)
Da Silva et al. 2004	Coronally advanced flap	68,8	11
Modica et al. 2000	Coronally advanced flap	80,9	58,3
Del Pizzo et al. 2005	Coronally advanced flap	67	60
Spahr et al. 2005	Coronally advanced flap	86,7	23
Castellanos et al. 2006	Coronally advanced flap	62,2	36,3
Pilloni et al. 2006	Coronally advanced flap	65,5	31,2
Huang et al. 2005	Coronally advanced flap	83,5	58,3

Miller was the first to postulate the feasibility of complete root coverage (CRC) using the free gingival graft (FGG) procedure for class I and II. However only a partial coverage for class III and no root coverage for class IV can be obtained using this method. From the numerous surgical

techniques utilized to augment gingival tissue dimensions the most frequently used was the free gingival graft. Longitudinal studies have shown that procedures using pedicle and free gingival grafts are predictable and effective for providing newly created keratinized tissue up to 4 years [3]. This procedure is currently used today and it represents the „golden standard" in gingival recession treatment. The major disadvantage of this technique is the requirement of a second surgical site. Because this second site is usually situated in the palatal area that is richly irrigated and presents major blood vessels a morbidity risk can appear. Also this second surgical site can produce a supplemental discomfort to the patient.

In order to solve these problems a new approach has bent taken in the treatment of the gingival recession searching for membranes. Still the connective tissue grafts were statistically significantly superior to guided tissue regeneration for improvement in gingival recession reduction while there was no difference concerning clinical attachment level. The histological findings indicate that healing following pedicle or free soft tissue grafts for root coverage procedures is represented by a combination of a long junctional epithelium and a new connective tissue attachment with cementum formation.

Table 2. *Mean root coverage and complete root coverage (%) with subepithelial connective tissue graft plus coronally advanced flap technique. (modified after Zucchelli&Mounssif 2015)*

Study	Flap procedure	Mean root coverage (%)	Complete root coverage (%)
Zucchelli et al. 2003	Subepithelial connective tissue graft plus coronally advanced flap	80.0	97.0
da Silva et al. 2004	Subepithelial connective tissue graft plus coronally advanced flap	75,3	18,1
Tatakis & Trombelli 2000	Subepithelial connective tissue graft plus coronally advanced flap	96.0	83.0
McGuire & Nunn 2003	Subepithelial connective tissue graft plus coronally advanced flap	93.8	79.0
Tal et al. 2002	Subepithelial connective tissue graft plus coronally advanced flap	88.7	42.8

Treatment of gingival recession with guided tissue regeneration using barrier membranes

This technique combines the coronally advanced flap achievement with a membrane barrier. Gottlow classify the membranes in three generations:

I. First generation (non-resorbable) includes Millipore filter, expanded polytetrafluorethylene membrane (e-PTFE), Nucleopore membrane and rubber dam;

II. Second generation (resorbable) includes collagen membrane, polylactic acid membrane (Guidor), vicryl mesh, Cargile membrane, oxidized cellulose membrane and hydrolysable polyester.

III. Third generation (resorbable with growth factor includes bio-resorbable membrane with added growth factor).

The studies showed that using this technique results in formation of new cementum with inserting collagen fibers in 74% of the cases treated with guided tissue regeneration compared with the control group. Another study [1] has shown that recession defects treated with guided tissue regeneration exhibited a five-fold increase in new connective tissue attachment compared with control.

The first type of membranes used was the non-resorbable membranes (acellular dermal matrix, or e-PTFE). The acellular dermal matrix was one of

the first materials used. This graft has been invented originally to cover full thickness burn wounds. Although this type of graft is still used today, clinical trials have involved were not very convincing. Due to its non-vital structure this graft is highly dependent on the cells and blood vessel present at the donor site in order to achieve the tissue reorganization required and this fact can lead to structural and functional deficiencies. Also it shown a high rate of shrinkage and the newly formed tissue is histological different when compared to the oral mucosa tissue especially when it's used to increase the width of keratinized tissue and it's not covered.

After the acellular dermal matrix failed to provide the desired results, studies were undertaken using non-resorbable membranes, predominantly based on a proprietary e-PTFE. The use of polytetrafluoroethylene (PTFE) membranes has been tested in controlled clinical studies in mandibular molar furcation and has shown statistically significant decrease in pocket depths and improvements in attachment level after 6 months. Tinti et al. [9] reported in a 12-case series, the treatment of gingival recession defects with a mean RD of 4.7 mm (Miller class II-III) using an PTFE membrane. The root coverage obtained by polytetraethylene membranes or bioresorbable membranes ranges from 54% to 87% (with a mean of 74%). The surgical technique included elevation of a bipedicle flap extending a minimum of two teeth mesial and one tooth distal to the tooth being treated, debridement the osseous defect and thoroughly plane the roots, reduction of the root surface convexity to provide a space with assistance of the PTFE membrane, then trimming the membrane to the approximate size of the area being treated. The membrane is then sutured tightly around the tooth using a sling suture, after that the flap tissues were advanced and positioned to completely cover the membrane and sutured. Membrane removal was scheduled at 4 weeks post surgery at which time the gingival flap was advanced to cover the regenerate layer underneath the membrane. The patients were evaluated at 6 months post surgery. Mean root coverage was 53% (2.5 mm) while the KG increased from 1.0 to 1.8 mm. The authors concluded that it is possible to use the principles involved in GTR however this method is not recommended to be routinely used because the root coverage varied considerably following this procedure. This result was confirmed by studies made by other authors [8], however, the use of this technique also resulted in several problems such as membrane exposure and contamination, technical difficulties when placing the barrier membrane and possible damage of the newly formed tissue as a result of its removal or absorption.

After different clinical test has showed the limitations of the non-resorbable membranes, a new approach has been taken and so the biodegradable membranes have been developed. The search for resorbable membranes has included trials and tests with numerous materials and collagens from different species such as, bovine, porcine etc. The placement of the resorbable barrier membrane is using the same surgical method as the non-resorbable one but have one main advantage which is the elimination of the second surgery procedure required for the removal of the non-resorbable membrane barrier.

At 12 months after performing surgery using guided tissue regeneration with barrier membranes an increased keratinized tissue width is commonly observed. Also the root coverage obtained is similar with the one obtained in treatment of gingival recession using free gingival graft [10].

Recent studies presented in the literature shows that the use of a barrier membrane, in conjunction with a coronally advanced flap, does not

improve the result of the coronally advanced flap alone in terms of complete root coverage and recession reduction [11].

At present, the use of a barrier membrane for root coverage procedures appears to be inadvisable, especially considering the high incidence of complications (i.e. membrane exposure).

CONCLUSIONS

All surgical techniques produced statistically significant improvements in gingival recession and clinical attachment level. The connective tissue grafts were statistically significantly superior to guided tissue regeneration for improvement in gingival recession reduction while there was no difference concerning clinical attachment level. For guided tissue regeneration no differences existed between resorbable and non-resorbable barriers with regard to clinical outcomes. The increase in keratinized tissue width is commonly observed following guided tissue regeneration in gingival recession defects with non-resorbable and resorbable barrier membranes. However, the changes in the amount of keratinized tissue, which can significantly affect the aesthetic outcome of treatment, have been shown to depend on the interactions among various tissues involved in the healing process and the selected surgical procedure. In order to find a barrier membrane that can be used as a perfect replacement for the gingival grafts further studies are required.

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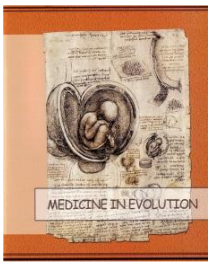
ORAL HYGENE AND PERIODONTAL HEALTH DURING ORTHODONTIC TREATMENT



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ABSTRACT

Aim and objectives: *Oral hygiene and periodontal health are some of the main concerns over orthodontic treatment. Although in recent years orthodontic appliances improved their design and got smaller, they are still bulky and represent a main source of dental plaque accumulation. The aim of this study was to compare the evolution of the periodontal status and oral hygiene efficiency of adults undergoing orthodontic treatment.*

Materials and Methods*: 25 adults male and female patients with ages between 20 – 25 years were tested for periodontal pocket depth (PPD), gingival recession(REC), bleeding on probing (BoP), clinical attachment loss (CAL) and plaque index (PlI) before orthodontic treatment and at timed intervals (1 month,3 month, 6 month and 12 month) after the bonding of brackets.*

Results: *All clinical measurements increased significantly during the 12 month period.*

Conclusion*: Orthodontic appliances favor bacterial plaque accumulation and gingival inflammation, both important risk factors in the etiology of the periodontal disease. Therefore it is very important to control plaque accumulation and gingival inflammation throughout the entire orthodontic treatment phase with emphasis on oral hygiene motivation and maintenance.*

Key words: *periodontal health, orthodontics, plaque accumulation*

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INTRODUCTION

In recent years more and more adults are seeking orthodontic treatment for various reasons: good esthetics, correction of malocclusion, space opening for implants, etc.. However, orthodontic treatment of adult patients is very different from the one of children and teenagers mainly because many adults have altered teeth, different types of dental restorations and possible periodontal problems[1,2].

Orthodontic biomechanics and forces cause the movement of teeth which in turn will cause important changes to all periodontal structures. Maintaining good oral hygiene is critical for periodontal health during orthodontic treatment and for preventing gingivitis and caries[3] Some studies found that gingival recession can be associated in some cases with orthodontic treatment[4]. Taking these accounts into consideration, the present day orthodontist needs to carefully assess the periodontal health before and especially during the therapy in order to achieve the best treatment results.

Periodontal tissue breakdown is a major concern during orthodontic treatment. Usage of strong forces associated with poor oral hygiene can have negative results concerning periodontal health and may cause root resorbtion which in turn leads to relapse and unstable dental structures.[5,6].

Gingivitis is the first sign of periodontal stress and is often associated with orthodontic treatment. However, most studies reveal that no significant long term changes occur in periodontal health as long as the inflammation is light and good oral hygiene is performed. However, the presence of periodontal pathogens in the subgingival plaque can lead to localized periodontitis and tissue breakdown[7].

Considering the potential harmful effects that orthodontic treatment could have on periodontal health in the presence of bacteria we found it important to observe the main clinical measurements for periodontal health: probing pocket depth (PD), gingival recession(REC), bleeding on probing (BoP), clinical attachment loss (CAL) and Silness-Loe plaque index (PlI) during orthodontic treatment. Although these measurements are not a stand alone diagnostics tool, they offer a good reflection on the periodontal status[8] and may determine future investigations. Another positive aspect of clinical measurements is that they are inexpensive, relatively quick to perform and available to all orthodontists without the need of expensive machines or biochemical markers.

MATERIAL AND METHODS

The full mouth longitudinal study was performed on 25 patients male and female with ages between 20-25 years, non-smokers with good periodontal health and no history of orthodontic treatment or periodontal problems. Before the bonding of brackets each patient was given full oral hygiene instructions, demonstrated on enlarged dental models and a detailed written procedure for dental brushing techniques.

PD, CAL and REC values were recorded using a color coded CPG-12 periodontal probe (Helmuth Zepf - Germany). In order to assess the periodontal status during orthodontic treatment all clinical measurements (PD, CAL, REC, BoP, PlI) were taken at specific times as follows: t0 (before bracket bonding), t1 (1 month after bonding), t2 (3 month after bonding),

t3 (6 month after bonding), t4 (12 month after bonding),. All measurements were performed by the same doctor. In order to make the measurements as objective as possible previous scores were hidden from the examiner and the patient.

The measurements were performed at all the teeth with bonded brackets and bands except for the Silness – Loe Plaque Index, which was recorded at the six sites described by the authors (maxillary right first molar and lateral incisor, maxillary left first bicuspid, mandibular left first molar and lateral incisor, mandibular right first bicuspid).

For each tooth 6 sites were probed (mesio-buccal, buccal, distal buccal, distal oral, oral and mesio oral). After the values were recorded, mean values were calculated for each patient and compared to previous scores. Mean values were calculated per tooth and per patient. PlI was recorded per patient (sum of scores/number of teeth evaluated).

RESULTS

All mean values for each recorded parameter are illustrated in Chart 1.

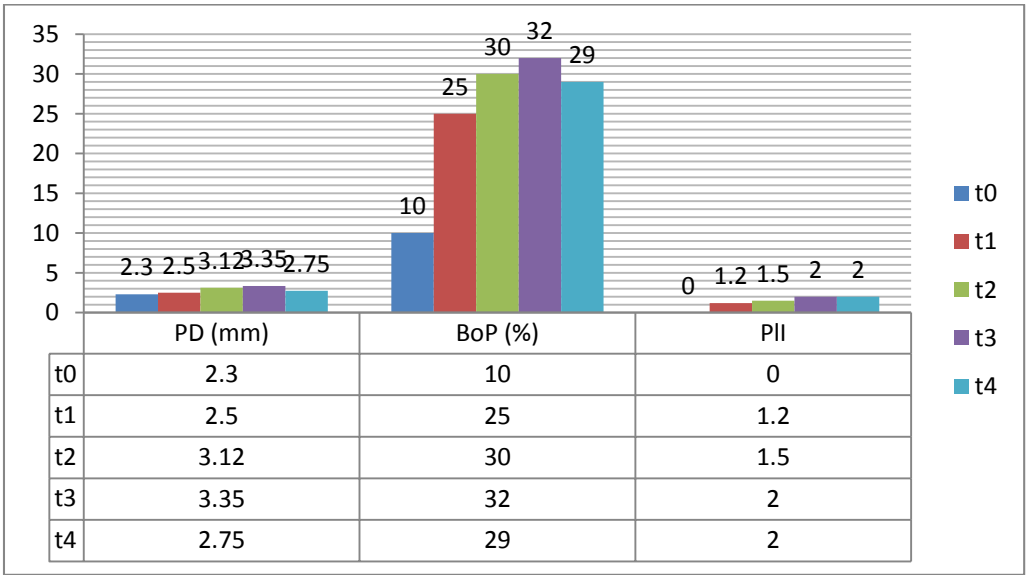
At baseline (t0) PD values had an average of 2.3 mm for all the patients. The highest mean score per patient was 3,5 mm and the lowest was 1.5 mm. BoP values were 10% for each patient and PlI value was 0 at all patients. REC values were also 0.

At t1 PD, PlI and BOP values increased, while REC and CAL values remained unchanged. PD increased with an average 0.2 mm and BOP scored 25%, marking a 15% increase compared to baseline. PlI total average score was 1.2.

After 3 months from bonding (t2) of the orthodontic appliance a slight increase of the clinical parameters was recorded. PD scored an average of 3.12 mm, BoP scored 30% and PlI total was 1.5. REC was not present

At t3 PD values increased to an average 3.35 mm, BoP scored 32% and PlI recorded a value of 2. As in previous visits, no positive REC value was recorded.

At t4, PD values decreased compared to those at t3 but still remained higher then initial values, with an average of 2.75mm. BoP settled at 29% and PlI at 2. REC was absent.



	PD (mm)	BoP (%)	PlI
t0	2.3	10	0
t1	2.5	25	1.2
t2	3.12	30	1.5
t3	3.35	32	2
t4	2.75	29	2

Chart 1. Mean values for the measured clinical markers

DISCUSSIONS

During the 12 months observational period, all the clinical markers recorded increased values constantly, although gingival recession was not recorded. PD, BoP and PlI values increased heavily during the first 6 months after bonding of brackets and bands. Considering the fact that the patients selected for this study were young adults, with ages between 20 -25 years with no periodontal problems, it is safe to assume that the increased values of PD and BoP were caused by gingival inflammation and not by destructive periodontal changes. This statement is in agreement with previous studies that reported gingival hyperplasia with the formation of pseudo pockets to set within months after bonding of orthodontic appliances due to plaque accumulation[9,10,11].

The increase in PD in this study was significant for the first six months of treatment (t3) as a 45% increase in the mean values for all patients has been recorded. A decrease in the values was noticeable at 12 months but they were still 19% greater then those at baseline (t0). Almost the same pattern was seen in the modification of PlI which reached the highest value at 6 months, but failed to improve at 12 month having the same value as t3. These findings are in tune with previous studies which concluded that in the first six month of orthodontic treatment PD and plaque accumulation values increased significantly, only to decrease slightly after 12 months.[12,13]. A study conducted by Boke et al[14]. in 2014 concluded that the mean value of visible plaque and inflammation showed significant increases during orthodontic treatment, stressing upon the need of healthy periodontal status maintenance during the treatment period.

REC and CAL values remained unchanged during the present study as contrary to previous studies which recorded loss of attachment and gingival recession in association with fixed orthodontic treatment.[14,15]. Renkema et al[16] found a positive correlation between gingival recession and orthodontic treatment and concluded that mandibular incisors are the most vulnerable to gingival recessions. However recent review studies of the literature stated that there is a weak evidence base for the correlation of orthodontic treatment and gingival recession. The authors concluded that gingival recession is more likely to appear during or after orthodontic treatment due to the presence or absence of certain risk factors such as: tissue biotype, alveolar bone thickness, oral hygiene and proclination of lower incisors, thus explaining the contradictory findings of clinical trials[17,18].

The present study has several limitations that include the small sample size and the fact that only clinical periodontal measurements were recorded in the assessment of periodontal health. Even thought clinical measurements are the primary tool for the evaluation of periodontal health, they do not represent a stand alone diagnosis tool, further microbiological and radiographical analysis being required in order to better assess periodontal status[19,20]. Still, the fact that gingivitis is present during orthodontic treatment represents a risk factor for the long term periodontal health of treated patients and all efforts must be taken in order to control plaque accumulation, gingival inflammation and bleeding.

Considering the fact that plaque accumulation is a risk factor for development of periodontal disease, it is essential to provide the patients with thorough dental hygiene instructions, before the treatment starts, and reinforced during every visit. Although gingivitis is not known to initiate periodontal disease by itself and is a reversible affection[21] controlling the

dental plaque accumulation and reducing the risk factors for any possible complication as result of orthodontic treatment is the safest and most recommended approach.[22].

CONCLUSIONS

- Fixed orthodontic appliances encumber oral hygiene and favor the accumulation of bacterial plaque which in turn causes negative effects on gingival and periodontal health;
- Clinical periodontal markers suffered a significant increase over a period of 12 months after bonding of brackets and bands;
- No gingival recession or signs of destructive periodontal processes was found, suggesting that present gingivitis is reversible and caused by plaque accumulation.

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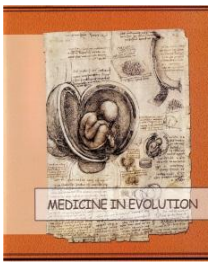
NANIC LATERAL INCISORS RESTORATION USING NO-PREP CERAMIC VENEERS – CLINICAL CASE



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ABSTRACT

Oral sphere is the primary site of many emotional conflicts, and therefore the aesthetic of dental treatments has great psychological importance. The oral cavity is the component through which the patient makes contact with the surrounding world and expressing feelings. Sometimes, minor differences in the length, shape and position of the maxillary teeth lead to major aesthetic changes.

In this paper we present the case of a patient who received complex aesthetic and functional restoration of the upper nanic lateral incisors, using no-prep ceramic veneers.

Key words: *integral ceramic veneers, nanic incisors, oral rehabilitation, aesthetic*

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INTRODUCTION

The smile, individual ability to express a range of emotions through the mobilization of the jaw and lips can often influence how a person can function in society.[1]

Aim of the aesthetic treatments would be to achieve an enhanced appearance, but naturalness emphasizes a vibrant and credible image for the patient. The purpose of aesthetic dentistry should be "bright, beautiful and credible".[2] One of the most important features that estimate facial attractiveness is "the smile" so often the need for "aesthetic" motivates the patient to seek dental treatment.[3]

Gingival framing on teeth added to symmetry of the smile. Health, color and texture of gingival tissues are extremely important for long-term success and aesthetic value of treatment. Healthy gingiva is usually pale pink, dotted, farm, with matt surface and a healthy gingival sulcus should not exceed 3 mm deep.[4] When fixed prosthetic restorations are made in the anterior region, clinicians are generally agreed that the gingival affecting normal tooth proportions, and thus have a direct impact on aesthetics.[5]

CASE PRESENTATION

I. Anamnesis:

A female patient, 17 years old, was presented in our clinic, requiring aesthetic rehabilitation of maxillary lateral incisors. At presentation, the patient's opinion was that these teeth were the only ones who need correction for aesthetic deficiencies.

II. Clinical examination

In clinical examinations we found the presence of the upper lateral nanic incisors, along with tooth rotations and minor rotation to buccal of teeth and the presence of reduces interdental spaces (fig. 1, 2).

Figure 1. Initial aspect in maximum intercuspidation

Figure 2 Maxillary arch seen from palatal.

III. Paraclinic investigation

Clinical examination was complemented by radiographic examination, which revealed that all teeth are vital and free of coronary or apical lesions.

IV. Treatment and evolution

The established diagnosis is dental alveolar disharmony with maxillary nanic lateral incisors (fig. 3 şi 4).

Figure 3. Initial aspect of tooth 12

Figure 4 Initial aspect of tooth 22

The orthodontic treatment was submitted to the patient as a first treatment option, followed by maxillary lateral nanic incisors veneering to restore aesthetics, but this treatment option was declined in favor of an exclusive prosthetic treatment that would solve aesthetics in anterior region of upper jaw. Because the patient is a minor, parents need to sign the informed consent form and the refusal of orthodontic treatment prior to prosthetic treatment.

By analyzing the patient's smile (fig. 5) we see that the smile line is middle, the patient unveiled the neck of the teeth in laughing/smile, which means that correcting of the gingival zenith sites is not found between the objectives of the treatment.

Following further discussions with the patient, we found that the position of maxillary central incisor is considered "personal charm," but the position of canines is slightly disturbing, especially because the disto-buccal rotation of 13. So, we decided that we have to correct lateral incisors and canines from upper jaw.

Figure 5. Smile analysis

Because of the age of the patient and our desire to give as much as possible a biological treatment, we proposed to perform no-prep ceramic veneers at 13, 12, 22 and 23.

We started making a diagnosis modeling (wax-up) to interested teeth, for testing the functional and aesthetic result of such treatment. Thus, we mark the impression of dental arches in adition silicone (Virtual, Ivoclar Vivadent), we recorded the intermaxillary occlusion relationship with Virtual CAD bite registration (Ivoclar Vivadent) and spatial position of the jaw towards the ATM with facial bow (UTS 3D Ivoclar Vivadent).

In the dental laboratory, the obtained study models were individually mounted in a semiadaptabil articulator (Stratos, Ivoclar Vivadent) and dental technician has achieved the wax-up of the interested teeth (fig. 6).

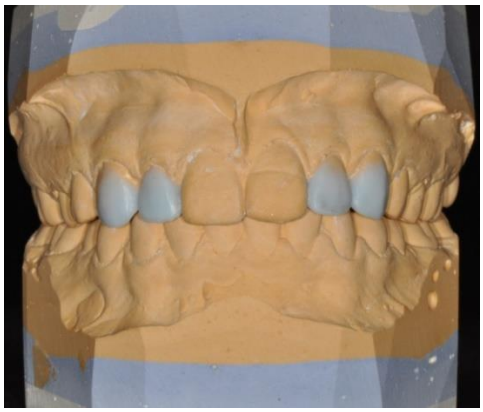

Figure 6. Wax-up

In the next clinical meeting, the wax-up was transferred to the oral cavity (Fig. 7) of the patient (mock-up) and we performed its aesthetic and functional testing. The main purpose of this treatment meeting is to obtain the patient's agreement about the shape and position of teeth. If the patient wishes to make additional changes on the teeth treatment seeking, it requires a new wax-up modeling that includes wanted changes.

Functional testing is performed by a dentist who will follow both mandibular movements with dental contacts and diagnostic positions of the mandible: maximum intercuspidation, (fig. 8), protrusive movement abutment (Fig. 9), left and right lateral movement.

Figure 7. The aspect of mock-up

Figure 8. Maximum intercuspidation

Figure 9. Protrusive movement

Once we obtained the patient's consent (in this case and for the parents, because the patient is a minor), we realized functional impression of maxillary arch. Because we will use no-prep veneers, it is not necessary any preparation of the teeth. But is necessary gingival eviction in order to make the impression (fig. 10), to transmit a dental technician the from of subgingival tooth morphology. A no-prep veneers ends in a 0.1 mm thick edges adapted to emergence profile of the tooth, according to its insertion axis.

In this case, the veneers are made of IPS e.max Press ceramic (Ivoclar Vivadent) by monolithic pressing. After completion them in the dental laboratory, they are adhesive cemented with Variolink Esthtic LC cement (Ivoclar), Light shade. The final aspect can be seen in Fig. 11 (front view).

The patient was instructed about cleaning of the restoration and was called to control at 9 days post-cementation. She was also included in a monitoring program, with regular checks at every 6 months.

Appearance of the veneers to a year and a half after cementing, when the patient presented to control, can be seen in fig. 12.

Figure 10. Gingival eviction

Figure 11. The final aesthetic aspect

Figure 12. Maximum intercuspidation aspect at 1,5 years

DISCUSSIONS

Since the mouth is the center of communication, the aesthetic appearance of the oral region during smile is a part of facial attractiveness.[6]

Smile design should always include the facial and dental assessment and analysis.[1]

The main criteria followed in the aesthetic testing of the wax-up are framing of the teeth in the general appearance of the face, smile line (upper lip line), incisor plan (lower lip line), buccal corridor and speech.

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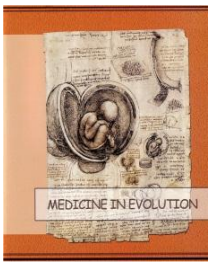
THE PROSTHODONTIC TREATMENT OF A COMPLETE ORAL REHABILITATION CASE



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ABSTRACT

The everyday smile is the key to success in many situations from everyday life. The partial edentation can benefit of various types of prosthodontic treatment.

In the present paper a complex oral rehabilitation case in a young female patient is presented, who wanted a quick radical change, which can assure her the full functionality of dental arches. The patient presented frontal crowding, multiple carious lesions and multiple radicular residues in the upper jaw and multiple carious lesions in the lower jaw. After the treatment of the carious lesions, the extractions of the radicular residues and the endodontic treatments and retreatments, the final prosthodontic restorations were perfomed.

Key words: *edentulous, prosthodontic restorations, dental implant*

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INTRODUCTION

Today, the aesthetic aspect holds an important role for the social integration of each patient. Therefore the demands and the knowledge of the patients have increased considerably.

In complex cases, there will always be more treatment options from fixed prosthodontics on implants or on teeth to mobile prosthesis or removable one.

But, the best solution, in order to avoid cutting and devitalizing adiacent healthy teeth is fixed prosthodontic on implants.

Even the worst dental problem starts form a simple dental cavity, a chronical destructive situation with multifactorial etiology which leads to the loss of the hard tissue[1], with the evolution towards an inflammatory pulpal disease.

The dental caries evolution can be rapid or slow, with intermittently periods of stagnation or acceleration. If treated correctly, the destructive process can be stopped.

Unresolved, the inflammatory process will determine pulpal necrosis and development of periapical pathology with hard tissue destruction in various degrees[4].

The present paper is a presentation of a clinical case in a young patient, who benefited of a complex treatment, in order to morpho-functionally recover the dento-alveolar arches affected by simple and complicated carious lesions trying to bring the result very close to the ideal situation.

CASE PRESENTATION

I. Anamnesis:

The female patient R.M., 26 years old, introduces herself to the dental office, with multiple carious lesions and radicular residues, which affected her aesthetic appearance, making her uncomfortable while simling (fig. 1).

II. Clinical examination and paraclinical examination

After clinical and paraclinical evaualtion, the following diagnostics were achieved:

1) General state - the patient declared being clinically healthy.
2) Caries diagnostic – multiple carious lesions simple and complicated, properly or improperly treated.
3) The emergency diagnosis - the patient presents hyperemic pain on tooth 34 (a big distal class II restoration with secondary cavity)
4) Periodontal diagnosis – no gingivitis or periodontitis signs.
5) Surgical diagnosis- the patient has many radicular residues on teeth 14, 15, 16, 24, 26. Extraction was recommended on these teeth and also on the wisdom teeth which have big carious lesions.

Oral mucosa diagnosis – normal aspect oral mucosa.

III. **Treatment and evolution**

In the first appointment, the extraction of the radicular residues from the first quadrant, 14,15,16 with immediate implantation in 14 and 16 positions.(Alpha Bio DFI 3.75 diameter and 16 mm length Implant) on 14 position and Alfa Bio SPI with 5mm wide and 10 long implant on 16 were perfomed.

On 15 position the surgeon made an intraalveolar bone graft of 0.3 gr BioOss, protected by a HeliPlug membrane.

An endodontic treatment was performed for tooth 17 in the same day.

Until the implants integration the carious lesions were treated on teeth 44, 45, 13, 12, 22, 27 and 31. For the fillings were used the following material: as a liner Ultra Blend (from Ultradent), as an adhesive sistem All

Bond 3 (Bisco) and Tetric Evo Flow and Evo Ceram (Ivoclar).

Teeth 35, 36, 46 and 47 were endodontically treated and rebuild with fiber post with Anatomic (Micro Medica) and Build It (Pentron Clinical).

After 6 months from 26 extraction internal sinus lift was performed with 2mm bone graft and 0.2 grams of MinerOss and an AlphaBio SPI implant of 5 mm diameter and 10 mm long was inserted. Soon after, the patient was also schedueled for the extraction of the 4 molars and the other implants uncovering (Fig. 3).

Another AlphaBio SPI of 4,2 mm diameter and 10mm long on 15 position with intraalveolar bone graft of 0.3 Grams BioOss and Helitape membrane was also perfomed. At this point, the temporary crowns on 14-16 and 24-25 could be made for an increased confort of the patient.

In the frontal maxilary area gingivectomy was perfomed.

In a week after the bone adition and the implant on 15 position, the implant was rejected spontanously. Imediatly an intraalveolar curretage was perfomed followed by MinerOss bone graft protected with Helitape membrane. In the same region, another implant was inserted after 3 months.

In the lower frontal area, the patient wanted to have a bleaching performed before the final prosthodontic restorations. At home Opalescence 15% (Ultradent) and trays were used.

Because the patient wanted a total change of her smile, the upper frontal teeth were cut, trying to be as conservative as possible. On 13,12 and 22 which already had former restorations it was necessary to make full-ceramic crowns. Teeth 11, 21 and 23 received veneers and the implants 24, 25, 26 ceramic fused on metal crowns.

Lower lateral teeth (35, 36, 46 and 47) were restored with individual ceramic fused on metal crowns.

For the cemetation Fuji IX (Gc) was used for the metallo-ceramic crowns on teeth, Temp-Bond (Kerr) for the ceramic fused on metal crowns on implants and Choice 2 (Bisco) for the veneers and fully ceramic crowns.

In the first quadrant a ceramic fused on metal bridge on implants was made (14-16), 9 months after the implant insertion

Figure 1. Initial aesthetic aspect

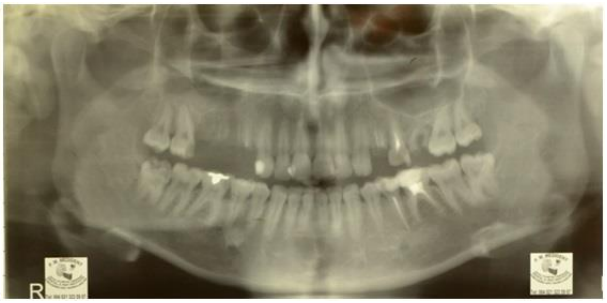

Figure 2. Initial panoramic X Ray

Figure 3. Intermediate panoramic X Ray

Figure 4. Intermediate panoramic X Ray, after the insertion of the implants

Figure 5. Color choosing

Figure 6. The final aesthetic aspect

DISCUSSIONS

The progress accomplished in dental medicine in the past years, concerning techniques, technologies and new materials is strictly related with the growth of therapeutic demands both coming from the patient as well as from the doctors.[3.6]

Ideally, the final restoration must be aesthetically and functionally sustainable and also biocompatible.[5] All successful prosthodontic rehabilitations come after an interconnected succession of clinical and laboratory phases.[2]

It is very important that the result, alongside functionality, to meet the aesthetic needs of the patient.

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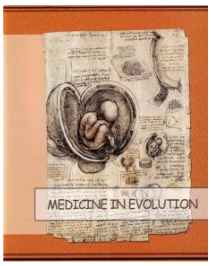

DURABILITY OF NON-INVASIVE VERSUS MINIMALLY INVASIVE SEALINGS: A RETROSPECTIVE STUDY OVER A 7 YEARS PERIOD

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ABSTRACT

Background *There are dentists who doubt the effects and durability of non-invasive sealings especially due to the reduced retention. Performing enameloplasty in questionable carious lesions may enhance the retention of the sealant.*

Aim and objectives *The study intended to assess the durability of minimally invasive sealings as compared to non-invasive sealings, in particular the retention of the material.*

Material and method *The study used a sample of 527 first permanent molars treated by dental students by two different types of sealing: 285 non-invasive and 242 minimally invasive sealings. The life tables method was used to determine the durability of sealants.*

Results *The sealings' median survival times were: non-invasive sealings - 722.35 days, minimally invasive sealings - 1068.60 days. The proportion of complete loss of sealant was 9.48% in the non-invasive type and 0.83% in the minimally invasive type.*

Conclusions *The survival time of minimally invasive sealings was almost one year longer than that of non-invasive sealings.*

Key words: *survival time, non-invasive versus minimally invasive sealings*

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INTRODUCTION

The occlusal surfaces in young patients have high caries susceptibility, especially those of the first permanent molar which often have deep narrow fissures or/and imperfect coalescence of the enamel in which bacteria are allowed to breed and tooth brushing is ineffective. It is therefore essential to seal the occlusal pit and fissure system of the caries-susceptible teeth by applying a suitable material into their retentive deep, narrow grooves for the purpose of acting as a physical protective barrier against caries-producing bacteria. [12]

Because assessing the caries activity in pits and fissures is often difficult many dentists fear to seal *questionable* carious lesions. The best diagnosis and treatment method is an exploratory technique called enameloplasty or fissure enlargement which constitutes a conservative technique that ensures the maximum preservation of healthy dental structure as well as the complete removal of all decay. By using this treatment method, the anatomy of the fissure is reshaped thus facilitating access, acid etching and bonding of the composite resin into the preparation, enhancing the retention by allowing deeper penetration of etchant and sealant. [3, 8, 15] However short-term clinical studies show that minimally invasive sealings are equal to but not better than non-invasive sealant placement without enameloplasty. [6]

OBJECTIVES

The aim of the study was to evaluate the durability of two different types of sealing (non-invasive vs. minimally invasive) in first permanent molars on a sample of children treated in the Paediatric Dentistry Clinic. In addition, the study compared the success and failure rates of sealings and tried to identify possible success predictors.

MATERIAL AND METHODS

The study was conducted in the Department of Paediatric Dentistry, School of Dentistry, University of Medicine and Pharmacy Carol Davila, Bucharest, Romania.

This retrospective study used the clinical records of 401 subjects (187 girls and 214 boys), aged between 5.27 and 17.75 years (mean age 8.49 ± 2.39 years) examined and treated over a period of 7 years (2006-2013) in the Paediatric Dentistry Clinic.

The study sample of teeth comprised of 527 first permanent molars treated by two different types of sealing: 285 non-invasive (sealing criteria: retentive pits and fissures on fully erupted molars, no caries/restorations, patient with high caries risk) and 242 minimally invasive sealings (sealing criteria: retentive pits and fissures on fully erupted molars, occlusal discolorations / minimal enamel caries, patient with high caries risk).

The first permanent molars' inclusion criteria for this study were: complete clinical records, sealings placed in our clinic, one follow-up appointment at least 3 months after sealant's placement.

Protocol for sealant technique

Sealants were applied by dental students which were previously trained in both sealing techniques by two investigators (AMR and VIF). The used sealing material was Fissurit F® (Voco).

The non-invasive sealings were applied using the standard technique. In the case of fissure staining, one-quarter round burs in high speed were used for the removal of carious tissue. Teeth were subsequently isolated and thoroughly cleansed, air dried and etched with 37% phosphoric acid gel

for 30 seconds. The sealing resin was applied and photo-polymerized for 40 seconds, premature contacts were eliminated and each sealing was evaluated according to the modified USPHS criteria for the direct clinical evaluation adapted for sealing evaluation were used to assess the status of each sealing [7] (**Table 1**).

All clinical records were completed after an examination performed by a single investigator (AMR). Dental examination was performed with a magnifying glass, after cleaning and air drying each tooth, using a dental mirror to observe stained pit and fissures system and a dental explorer to verify the presence of sticking.

Table 1. *Modified USPHS* criteria*

Criteria	**Code****	**Clinical appearance**
Retention	A	Sealing is present
	B	Sealing is partially lost (no need of repair, all pits and fissures are covered)
	C	Sealing is partially lost with the need of repair
	D	Sealing is totally lost
Marginal integrity	A	Sealant adjacent to the tooth (explorer does not penetrate or stick)
	B	Sealant's margin detectable with the explorer (ledge at interface)
	C	Visible crevice along the sealant's margin
	D	Crevice formation with exposure of central fissure
Marginal discoloration	A	No discoloration
	B	Slight discoloration noted along the margin
	C	Moderate discoloration along the margin
	D	Severe discoloration with evidence of penetration and leakage
Anatomic form	A	Sealant is continuous with existing anatomical form
	B	Sealant is slightly discontinuous with existing anatomic form
	C	Sealant is moderately discontinuous with existing anatomic form
	D	Sealant is severely discontinuous with existing anatomical form
Surface texture	A	Surface texture of sealant is similar to the enamel surface
	B	Surface texture of sealant is gritty
	C	Sealant's surface presents bubbles not connected with the margins
*United States Public Health Service; **A (alpha) – clinically ideal; B (bravo) – clinically acceptable; C (charlie) – repair needed; D (delta) – replacement needed.		

The research was based on the analysis of the following data obtained from the clinical observation charts: personal data (name, gender, date of birth, living environment), administrative data (date of the first dental visit, date of the last dental visit when a complete dental status was recorded), clinical data (condition of the first permanent molars at the first consultation and its evolution during the dental treatment), therapeutic data (date of sealant placement, sealing type, date of the sealing's failure, sealing's rating according to the modified USPHS criteria).

The independent variables used for the statistical determinations were age, gender and the type of sealing, while the dependent variable was the survival rate of the sealing, expressed as a time measurement. The life table method was used to determine the survival rate of sealants. All results were confirmed by the Kaplan–Meier method. Parametric and non-parametric tests (one-way ANOVA and Wilcoxon) were used for statistical comparisons. All tests of significance were two-tailed. We used Stata 11IC (StataCorp LP, Texas, USA, version 2009) in the data analyses and Microsoft Excel 2010 for graphical representation of the results. A p-value <0.05 was considered statistically significant.

RESULTS

The structure of the study sample of patients according to gender was as follows: girls 46.63% (n=187), boys 53.37% (n=214).

The structure of the study sample of sealed teeth according to the type of sealing was as follows: non-invasive sealings 57.08% (n=285), minimally invasive sealings 45.92% (n=242).

The results of the clinical evaluation of both types of sealings are presented in Tables 2, 3.

Table 2. *Clinical evaluation ratings for non-invasive sealings*

Criteria	Rating N (%)			
	A	B	C	D
Retention	186 (65.26)	26 (9.12%)	46 (16.14%)	27(9.48%)
Marginal integrity	249 (87.37%)	36 (12.63%)	-	-
Marginal discoloration	274 (96.14%)	9 (3.16%)	-	2 (0.7%)
Anatomical form	272 (95.43%)	12 (4.22%)	1 (0.35%)	-
Surface texture	279 (97.89%)	5 (1.75%)	1 (0.36%)	n.a.

Table 3. *Clinical evaluation ratings for minimally invasive sealings*

Criteria	Rating N (%)			
	A	B	C	D
Retention	183 (75.61)	20 (8.27%)	37 (15.29%)	2 (0.83%)
Marginal integrity	209 (86.36%)	33 (13.64%)	-	-
Marginal discoloration	231 (95.45%)	5 (2.07%)	5 (2.07%)	1 (0.41%)
Anatomical form	234 (96.69%)	4 (1.65%)	1 (0.41%)	3 (1.25%)
Surface texture	230 (95.04%)	2 (0.83%)	10 (4.13%)	n.a.

The sealings' median survival time according to gender was the following: girls – 1053.38 days, boys – 1308.85 days.

The sealings' median survival time of according to the *living environment* was the following: urban – 766.99 days, rural – 1047.00 days. Although the median survival time of the sealings was higher in girls and in children living in rural areas than in boys and children living in urban areas, the differences were not statistically significant (p=0.485/0.120).

The sealings' median survival time according to the type of sealing was as follows: non-invasive sealings - 722.35 days, minimally invasive sealings - 1068.60 days (**Fig. 1**). The sealings' median survival time was statistically significant higher for the minimally invasive sealings (p=0.015).

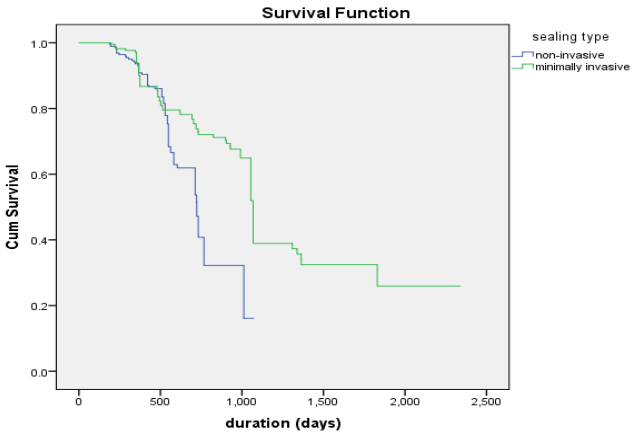

Figure 1. Survival curves by sealing type

The sealings' median survival times according to the age group of the patient were the following: 5-7years – 581.71 days, 7-9 years – 1829.27 days, 9-11 years – 1829.31 days, 11-13 years – 899.80 days.

The sealings' median survival time according to the *age groups* indicated that the age group with the lowest survival time was 5-7 years. The differences were statistically significant in comparison with all other age groups (7-9 years $p<0.001$, 9-11 years $p<0.001$ and 11-13 years $p=0.036$). Age was confirmed to be a predictor for the survival time of both types of sealings.

The sealings' median survival times according to the dental arch were the following: maxillary – 990.16 days, mandible – 1053.77 days. Although sealings lasted longer in mandibular teeth, differences recorded between *dental arches* were not statistically significant ($p=0.295$).

The sealings' median survival times according to the sealed tooth were the following: 1.6 – 766.73 days, 2.6 – 1047.00 days, 3.6 – 1068.63 days, 4.6 – 1053.01 days. There were no statistically significant differences between the median survival times of sealings according to the *teeth criterion* ($p>0.05$), although the highest survival time was recorded in 3.6, followed by 4.6.

The overall causes of the sealants' *failure* were as follows:

- partial or complete loss of sealant: 83.00% (n=112).The distribution of the failures due to retention loss according to the type of sealing was the following: non-invasive sealings – 55.3% (n=73), minimally invasive sealings – 44.7% (n=59),
- inacceptable surface texture: 8.10% (n=11),
- marginal discoloration: 5.20% (n=7),
- loss of the anatomic form: 3.70% (n=5).

The survival time of the sealings according to the type of failure was, in descending order, as follows: marginal discoloration – 1362.5 days, loss of anatomic form – 731.5 days, partial or complete loss of retention – 548.38 days, texture defects - 483.5 days. The median survival time of sealings varied according to the *type of defect* ($p=0.006$). The highest median survival time was recorded in sealings that eventually failed due to marginal discoloration (p between 0.003 and 0.005).

Among the sealings that failed due to retention loss, the median survival time of non-invasive sealings was 528.30 days and of the minimally invasive sealings was 990.5 days. Minimally invasive sealings lasted more than non-invasive sealings ($p<0.001$).

The survival probability of both types of sealings by 1 year intervals is presented in Table 4.

Table 4. *The survival probability of the sealings by 1 year intervals*

Sealing type	Time	Number Entering Interval	Number Withdrawing during Interval	Number of Terminal Events	**Proportion Surv. End of Interval**	Std. Error of Prop. Surv. at End of Interval
Non-invasive	0-1 year	285	68	7	.97	.01
	1-2 years	210	128	56	.60	.04
	2-3 years	26	12	14	.18	.06
Minimally invasive	0-1 year	242	75	13	.94	.02
	1-2 years	154	57	13	.84	.03
	2-3 years	84	36	24	.53	.05
	3-4 years	24	0	4	.45	.06
	4-5 years	20	0	0	.45	.06
	5-6 years	20	0	4	.36	.06
	6-7 years	16	16	0	.36	.06

The probability of maintaining adequate retention in both types of sealings by 1 year intervals is presented in Table 5.

Table 5. *The probability of maintaining adequate retention of sealings by 1 year intervals*

Sealing type	Time	Number Entering Interval	Number Withdrawing during Interval	Number of Terminal Events	**Proportion Surv. at End of Interval**	Std. Error of Prop.Surv. at End of Interval
Non-invasive	0-1 year	285	68	7	.97	.010
	1-2 years	210	131	53	.62	.039
	2-3 years	26	13	13	.21	.071
Minimally invasive	0-1 year	242	80	8	.96	.014
	1-2 years	154	63	7	.91	.020
	2-3 years	84	38	22	.60	.054
	3-4 years	24	4	0	.60	.000
	4-5 years	20	0	0	.60	.000
	5-6 years	20	2	2	.54	.043
	6-7 years	16	16	0	.54	.000

DISCUSSIONS

The median survival time of the sealings was higher in girls, however this result was not statistically significant although this is in concordance with the results obtained by Samara and Haidar (2011). This situation may be explained by the fact that girls were more cooperative towards the dental treatment. [13]

The median survival time of the sealings was higher in children living in rural areas. Although this result was not statistically significant, it may be explained by the fact that, in our experience, children in rural areas are more disciplined and therefore cooperate better with the dentist. We did not find any data in the literature concerning this aspect.

Sealings seemed to last longer in mandibular teeth, although differences recorded between *dental arches* were not statistically significant. This situation is in concordance with the results in other studies and may be explained by the ease of direct visual access and also by the gravitational force which allows for a better flowing of the sealant into the pits and fissures system. [1, 12, 18] Ninawe et al. (2012), however, reported a better durability of resin-based sealants (Helioseal®) in the upper arch. [11] At the mandibular teeth, sealings' durability seemed to be higher in 3.6 than in 4.6 which may also be explained by the ease of visual access.

The better survival times recorded in children over 7 years of age was probably due to the facts that younger children were less cooperative and the operator's access was more difficult, influencing the quality of isolation. These results are supported by Nilchian et al. (2011), although other researchers concluded that the younger the child when the sealing is applied the longer the sealing will remain intact (Samara and Haidar, 2011). [10, 13]

The main cause of failure was loss of retention, probably because of the lack of clinical experience of the students leading to a prolonged work time that may have increased the risk of imperfect isolation, as shown in other studies [9, 10, 12, 17]. Also, another possible cause of partial loss of retention might be over-evaluating the need for sealing in some areas of the fissure system.

The lowest median survival time was recorded in sealings failing due to surface texture defects followed by sealings failing due to the loss of retention. As the aforementioned

texture defects consisted in air bubbles incorporated into the sealing material during its application we attribute them as well to the lack of clinical experience that led to technique errors. This error was detected soon after application of the sealing material which has led to its early replacement. The presence of the greater number of bubbles in the case of minimally invasive sealings can be explained by the greater thickness of the material that allowed the incorporation of a greater quantity of air.

The fact that minimally invasive sealings lasted more than non-invasive sealings may be due to the increased retention obtained from the ultra-conservative cavities resulting after performing enameloplasty. This result is in concordance with Chan et al. (1999) which assessed that teeth prepared with burs demonstrated a better seal in fissures evaluated in vitro. [4] Also, Shapira and Eidelman (1986) suggested that the instrumentation of fissures results in a thicker layer of sealant with better retention. [14] However, another in vitro study (Blackwood et al., 2002) indicated that it makes no difference what type of fissure preparation is used as long as it is followed by acid etching prior to sealant placement. [2]

The evaluation of minimally invasive sealing in our study compared to data reported by Stadler (1993) showed a survival rate of 90.52% versus 94.3% in relation to the complete loss of sealant, and 83.86% to 77.2% in relation to the partial loss of sealant. [5]

The survival probability in both types of sealing drops after 2 years (Table 4), especially because of retention loss (Table 5). Although the survival rate for non-invasive sealing in the first two years was comparable to that resulting from other studies, further developments showed a dramatic loss after the third year when the survival rate was only 18%. [16] In our study in the case of minimally invasive sealings the survival rate gradually decreased after the first year from 94% to 36% at 6 years.

CONCLUSIONS

The survival time of minimally invasive sealings was almost one year longer than that of non-invasive sealings.

The sealings' survival time was higher when applied in children over seven years of age.

The main cause of failure in both types of sealings was the loss of retention, probably because of poor isolation due to the student's insufficient clinical experience.

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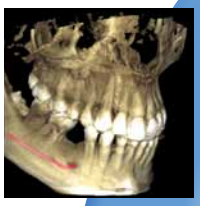

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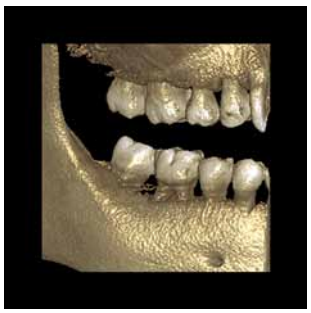

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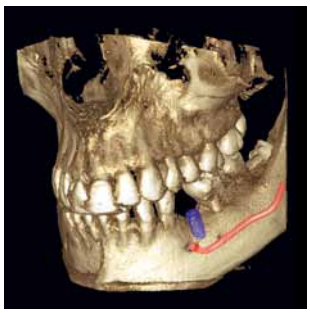

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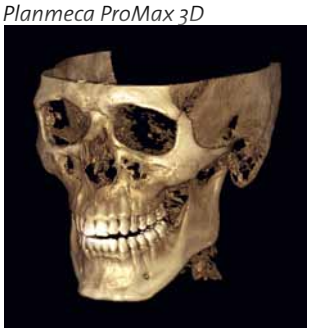

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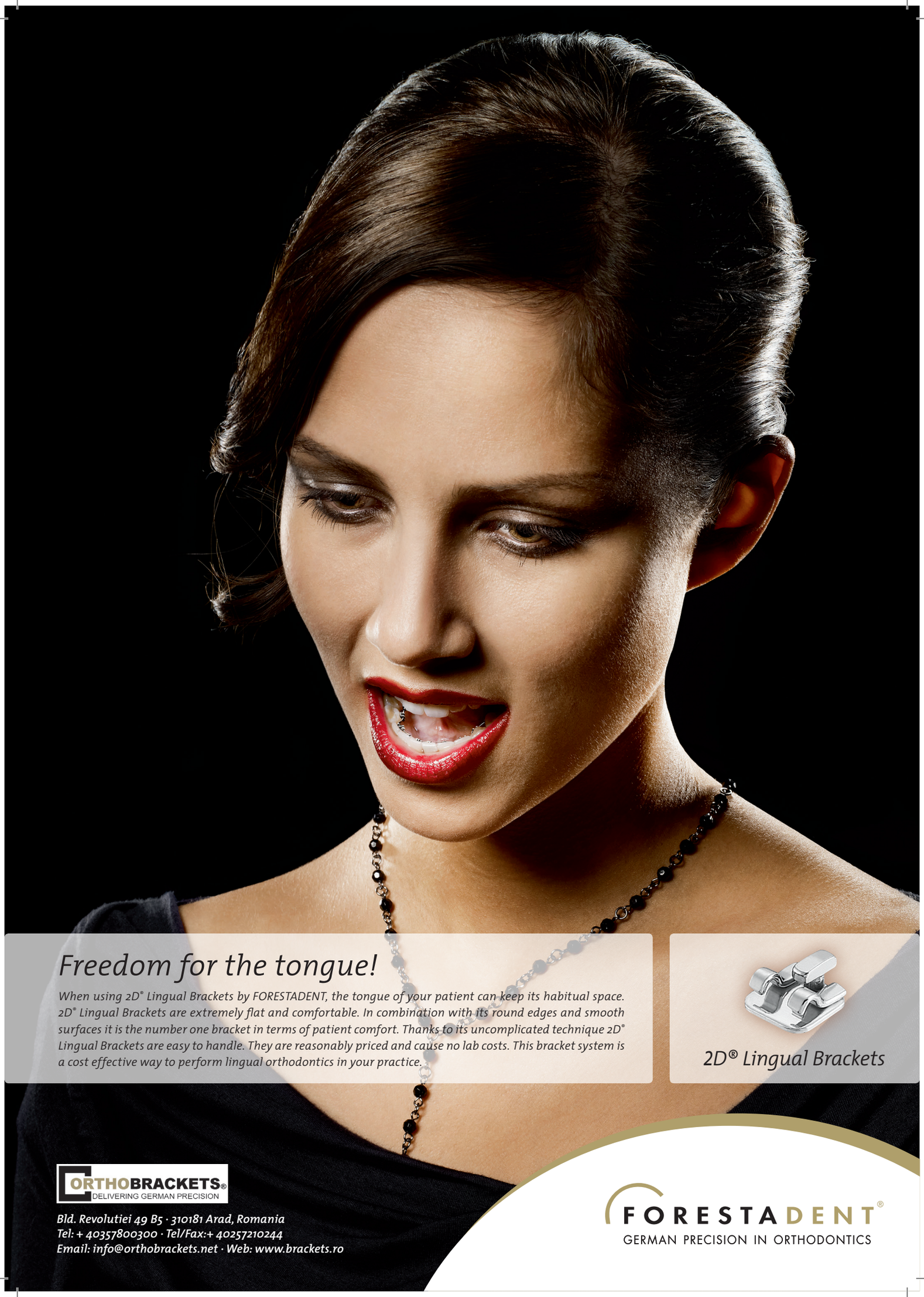
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