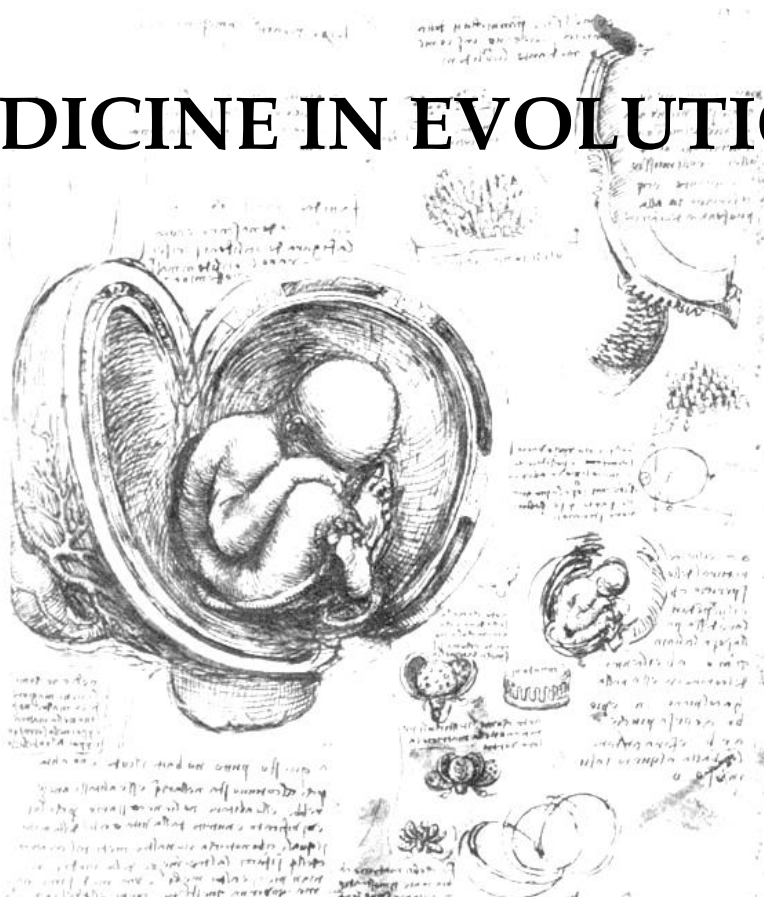


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DIAGNOSIS AND TREATMENT OF HEPATIC TRAUMA IN POLYTRAUMATIZED PATIENTS



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ABSTRACT

The liver is involved in approximately 15-20% of the abdominal lesions (1,2,3,4) and is the cause of approximately 50% of the deaths following these lesions. Moreover, up to 74% of the hepatic lesions are associated with other thoracic and diaphragmatic lesions. Polytraumas associated with liver trauma represent a major severity factor and require accurate evaluation.

The method: During our study we analyzed 82 consecutive cases of hepatic trauma which were hospitalized and underwent surgery at the Emergency Surgery Clinic of the City Hospital Timisoara, starting April 1st, 1994 until December 31st, 2011. The cases were analyzed retrospectively based on the lesional mechanism, topological distribution of lesions, lesions severity, associations with other lesions, investigations and preoperative management, as well as surgical techniques and results.

Results: The analysis of the cases based on preoperative diagnosis showed that abdominal ultrasound exams are of great importance, as for the analyzed series, the laparotomy indications established by the ultrasound exam had a 100% sensitivity, although it was focused more on highlighting the hemoperitoneum and less on localization and exact description of the intra-peritoneal hemorrhagic lesions.

Computer tomography (CT) is the selected method in preoperative diagnosis of hepatic trauma, efficient for highlighting hepatic lesions as well as for evaluating the quantity of blood present in the peritoneal cavity. The most reliable method in this sense is the spiral computed tomography, which gives the possibility to do the AAST evaluation of the visualized hepatic traumatic lesions.

Regarding the surgical methods for hepatic hemostasis, 14 of the 82 analyzed patients benefited of hepatic lodge packing and 20 of direct lesion packing. These procedures address severe lesions at hemodynamically instable patients starting right after hospitalization. Hemodynamic instability was significant each time and measures for volemic compensating was followed by minimum or absent results and the ultrasound exam revealed the hemoperitoneum.

Conclusions: The analysis of the cases showed that hepatic traumas are a constant presence in emergency surgery and they are significantly complex intrinsically and by the associated pathology.

Successful treatment of hepatic trauma patients requires considering several elements: accurate evaluation of the traumatized patient with lesion rating; full evaluation of hepatic lesions and placing them in the complete lesional framework of the patient, as well as establishing the surgical procedure suitable for the hepatic lesions and for the traumatic and general status of the patient.

Keywords: hepatic trauma, abdominal ultrasound, hemodynamic instability, lesional association, computed tomography.

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INTRODUCTION

The liver is the second most frequent abdominal viscera interested in abdominal traumas and, at the same time, represents the main mortality cause due to this kind of lesions. Indeed, the liver is involved in approximately 15-20% of the abdominal lesions (1,2,3,4) and is the cause of approximately 50% of the deceases following these lesions. Moreover, up to 74% of the hepatic lesions are associated with other thoracic and diaphragmatic lesions. Regarding the localization of the lesions, most frequently they occur in segments 6, 7 and 8 (over 85% of the cases). This is explained by the significantly larger volume of the right lobe (60% of the total mass of the parenchyma) and by the close relations between this and the costal arch and the posterior wall.

Regarding the lesional mechanism, studies taken in Germany and Switzerland showed a clear prevalence of hepatic lesions due to abdominal contusions representing 80-90% of the cases (5, 6).

Regarding medical procedures, the status of the patient when he is brought in the emergency room is of great importance, the hemodynamic stability or instability being decisive factors for the establishing the diagnosis and treatment approach. Moreover, complete patient examination targets identification of all associated lesions (of the cranium, thorax, basin or limbs). as well as their rating.

Therefore, in case of severe trauma, with clear signs of hemorrhagic shock (hypotension, tachycardia, oliguria, cold sweat and agitation followed by obnubilation),

the approach will be energetic with possible immediate surgical intervention.

The abdominal ultrasound is usually the first exploration performed by the emergency service on the abdominal traumatized patient, as this exploration can be done quickly both in the emergency room and in the surgery room. An important quantity of intraperitoneal fluid generated by trauma, mainly hemoperitoneum, indicates by itself the need for emergency exploratory laparotomy (7, 8). Nowadays it is considered that the accuracy of the method in this situations is almost 98% for third or higher degree hepatic lesions.

Computer tomography, especially the one with contrast agent for spiral CT, is nowadays the selected exploration for hepatic trauma. The method allows accurate evaluation of the hepatic lesions and rating them according to the AAST classification.

The hemodynamically instable patient raises specific and more complex problems, since acute hemorrhagic anemia can occur anytime during the hospitalization.

In the last decade, the conservative treatment of the abdominal lesions has become a standard for first and second degree hepatic lesions, and in specialized services, this treatment is extended also for third degree lesions. Moreover, the hemodynamic state of the patient and the presence or absence of intraperitoneal irritation signs are the main criterion for deciding on an emergency laparotomy on the abdominal traumatized patient, with hepatic lesions revealed by ultrasound and/or tomographic exams.

MATERIAL AND METHOD

Our study comprises 82 consecutive cases of hepatic trauma which were hospitalized and underwent surgery at the Emergency Surgery Clinic of the City Hospital Timisoara, starting April 1st, 1994 until December 31st, 2011. The cases were analyzed retrospectively based on the lesional mechanism, topological distribution of lesions, lesion severity, associations with other lesions, investigations and preoperative management, as well as surgical techniques and results.

Lesion severity / Number of cases

I degree / 18

II degree / 30

III degree / 21

IV degree / 10

V degree / 3

The distribution of the lesions on the liver and the lesion types showed the followings:

Topographic lesional types / Number of cases

Right hepatic lobe lesions / 44

Left hepatic lobe lesions / 29

Both hepatic lobes / 9

Regarding the intra-abdominal traumatic pathology, hepatic lodge packing addressed both isolated hepatic traumas as well as traumas with associated abdominal or extra-abdominal lesions. Concerning this aspect, in the analyzed cases we distinguish the following lesional associations:

Associated lesions / Number of cases

Acute craniocerebral trauma / 16

Myelomatoid cervical spine lesion / 1

Non-myelomatoid thoracic spine lesion / 2

Pulmonary contusion / 6

Hemopneumothorax / 17

Trachea fissure and right lung explosion / 1

Diaphragm rupture / 4

Costal fractures / 14

Limb fractures / 11

Heart contusion / 5

Pancreatic contusion / 5

Spleen rupture / 11

Retroperitoneal hematoma / 10

Kidney rupture / 3

Mesentery or intestine lesion / 8

DISCUSSIONS

After analyzing the hepatic trauma cases hospitalized and operated in the General Surgery Clinic of the City Hospital Timisoara, we can draw the following conclusions: the study included 82 cases of hepatic trauma operated in the clinic; distribution of cases based on gender included 57 men and 25 women which is consistent with current literature referring to prevalence of hepatic traumas at male patients.

Concerning the age distribution of the patients with hepatic trauma

included in the study, although it spread over a large domain, the predominant ages were between 20 and 40 years. This is normal since, in general, traumas are specific for active people.

From the analysis of the causes of the hepatic trauma lesions it is clear the prevalence of abdominal contusions, most of these being the result of various road accidents (59 cases).

From the point of view of topographic distribution of liver lesions, most of them occurred in the

right hepatic lobe (44 cases), a fact also met in the literature and justified mainly by the considerably larger volume of this lobe compared to the left one, but also by its frequent inclusion in right hemithorax lesions.

Regarding the preoperative diagnosis, the analysis of the cases shows an unequivocal importance of the abdominal ultrasound exam. For a romanian hospital, the abdominal ultrasound is nowadays an accessible, reliable and non-invasive method and provides the possibility of repeating it as many times as necessary since it is not harmful. For the analyzed series, the laparotomy indication established by the ultrasound exam had a 100% sensitivity, although it was focused more on highlighting the hemoperitoneum and less on localization and exact description of the intra-peritoneal hemorrhagic lesions (Fig. 1).



Fig. 1

The most reliable method is the spiral computer tomography which gives the possibility to do the AAST evaluation of the visualized hepatic traumatic lesions. Thus, it allows the initiation of the therapeutic algorithm from the first minutes until a result is achieved and, therefore, it is recommended for immediate emergencies on patients hemodynamically stable for which the ultrasound exam revealed the presence of hemoperitoneum (Fig. 2).

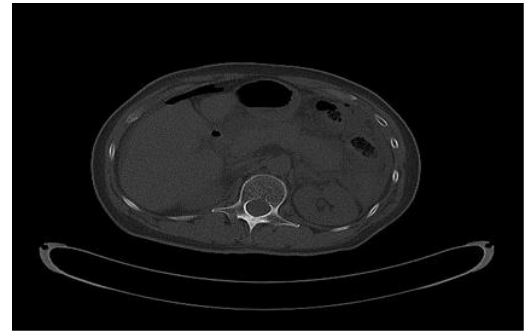


Fig. 2

Thus, tomographic exploration is an excellent diagnosis mean, showing with accuracy the hepatic lesions and allowing a correct evaluation of the intraperitoneal blood volume. Moreover, computer tomography allows also diagnosis of associated abdominal and thoracic lesions.

Concerning the surgical methods for hepatic hemostasis, among the 82 analyzed patients, 14 benefited from hepatic lodge packing. This procedure targets critical lesions for patients hemodynamically unstable, starting immediately after hospitalization. Direct lesion packing (Fig. 3) was used in our clinic for treating hepatic traumatic lesions at 20 patients, but its efficiency is limited in case of third or higher degree lesions. Because of that, it was used as unique procedure for first and second degree lesions or associated with other hemostasis procedures.

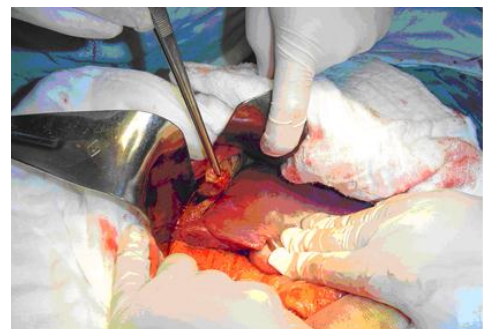


Fig. 3

Hepatic resections remain one of the most utilized procedure, widely

presented in world literature, but for the series considered in our study, we recorded only two such procedures. From the point of view of the techniques used, one case employed a bisegmentectomy II, III achieved through primary parenchymal transection, associated with the Pringle maneuver. The second case presented an atypical hepatectomy (resectional debridement) of segment III and partially segment II, which was dictated during surgery by a significant contusion of the hepatic parenchyma which was subject of resection. The Pringle maneuver was also used in this case (Fig. 4), and the resection of the hepatic transe was done using the Kellyclazie procedure, associated with mattress suture (Fig. 5) and followed by direct lesional packing externalized through the opposite pole of the incision.

The mortality in the analyzed cases was within the normal limits presented in literature, being approximately 10%.



Fig. 4

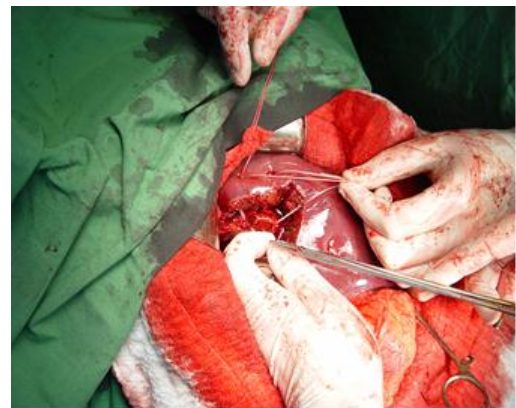


Fig. 5

CONCLUSIONS

1. The hemodynamic state of the patient and the presence or absence of peritoneal irritation signs represent the main criterion which can decide an emergency laparotomy for the abdominal traumatized patient, with hepatic lesions established through ultrasound or tomographyc exam.

2. The ultrasound exam is in our opinion a mandatory exploration for abdominal traumatized patients. Its value is significant since it can reveal the presence or absence of the hemiperitoneum; moreover, the exploration gives an estimation of the quantity of blood accumulated in the

peritoneal cavity and allwos monitoring its evolution.

3. Nowadays, the conservative treatment approach is safe for hepatic lesions of up to third degree, according to the AAST classification, and this only for carefully selected cases. Extending this indication for higher degree lesions (III, IV or V) is risky in the current context.

4. For any kind of lesion, the major criteria are represented by the hemodynamic stability of the patient, the absence of active bleeding during dynamic paraclinical examinations and the lack of signs of acute surgical abdomen.

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STUDY OF WORK RELATED MUSCULOSKELETAL COMPLAINTS TO COMPUTER WORKERS



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ABSTRACT

Objectives: To research the prevalence of work-related musculoskeletal complaints (WRMSC) to computer workers, to identify and analyze the risk factors.

Material and methods: this study was based on a questionnaire related to computer work - environmental conditions, work organization, complaints. 232 subjects answered the questionnaire.

Results: The 1-year prevalence of WRMSC among Romanian computer workers was 47%. The highest prevalence rate of WRMSC was found to women, for cervical localization. Statistical analysis identified as risk factors for WRMSC: gender (women), age (over 40 years), lack of breaks or break time under 5 minutes and some additional factors related to workstation – thermal comfort and ventilation of the offices, chair characteristics and postural comfort.

Conclusion: The 1-year prevalence of WRMSC among Romanian computer workers is high and comparable with prevalence in western countries. The self-administered questionnaire can be useful for risk factors identification, which is important for implementation of prophylactic ergonomic strategies.

Key words: computer work, work-related complaints, musculoskeletal, ergonomics.

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INTRODUCTION

Computer usage in many professional activities has expanded dramatically in the last two decades together with the development of information technology. Occupational medicine reported the occurrence of a new pathology related of professional users of computers: visual disturbances, musculoskeletal symptoms, chronic fatigue syndrome 1. The majority of work related musculoskeletal symptoms can't be classified as diseases or clinical syndromes. The symptoms are almost generally regional and unspecific 2. Intensity, duration and frequency of symptoms are variable but associated with professional activity. Work related musculoskeletal disease has many risk factors: physical,

psychosocial and individual 3. These factors are intricate and influenced by organizational and cultural factors.

Considering the development of computer work in Romania, the clinical experience with such patients and the impact of work related diseases in daily activities, we considered interesting to perform an analysis of work related musculoskeletal diseases and working conditions for our country.

Objectives

Aims of this study are: 1. to investigate the 1-year prevalence of work-related musculoskeletal complaints (WRMSC) among Romanian computer workers; 2. to identify and analyze the risk factors for WRMSC to computer workers.

MATERIAL AND METHOD

This is a retrospective cohort study performed since November 2009 to October 2010 on a sample of professional computer users from several institutions in Romania, working in different areas - IT, commerce, administration, insurance. They were asked to complete a questionnaire about computer related work. The questionnaire was applied by e-mail or in hardcopy. The participants also received an information letter about the study and about the confidentiality conditions.

The assessment was conducted with a self-reported questionnaire elaborated on the base of questionnaires internationally confirmed: Nordic Musculoskeletal Questionnaire (NMQ) 4, Dutch Musculoskeletal Questionnaire (DMQ) 5. The aim of our questionnaire is to

collect data about work conditions, physical and medical condition of computer workers during the previous 12 months. The self-reported questionnaire consists of 62 items with a completion time of 10-15 minutes. These items are grouped in six main domains: general information for demographics data, work characteristics, workplace and workstation characteristics, psychosocial characteristics, health and physical activity status, musculoskeletal complaints (if they are present).

Statistical methods

We used the descriptive statistic for demographic data and complaints analysis. In analytic statistic, we used chi-square test and risk analyze with relative risk indicator. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

We distributed 258 questionnaires and received back 232 (an answer rate of 92%).

Demographic and occupational characteristics of the study population

The cohort consisted of 232 computer workers who responded to questionnaire. The demographic and occupational variables are presented in Table number 1.

Table 1: The demographic and occupational variables of the cohort. (Total number: 232 computer workers).

DEMOGRAPHIC AND OCCUPATIONAL	NUMBER	PERCENT (%)
Age		
<40 years	180	88
≥40 years	52	22
Gender		
Men	111	48
Women	121	52
BMI (Body Mass Index)		
≤25	157	67
>25	75	33
Working days/week		
3-4 days	5	2
5 days	136	59
6 days	56	24
7 days	35	15
Hours/day spent on Computer work		
≤4 hours	13	5
> 4 hours	219	95

Table 2: Localisation of musculoskeletal complaints

Localization of complaints	TOTAL (N=232)	%	Men (N=111)	%	Women (N=121)	%
Upper limb	13	5.6	5	4.5	8	6.6
Shoulder	32	13.8	12	10.8	20	16.5
Elbow	4	1.7	1	0.9	3	2.5
Wrist	6	2.6	2	1.8	4	3.3
Back	42	18.1	12	10.8	30	24.8
Neck	54	23.3	12	10.8	42	34.7
Upper back	12	5.2	4	3.6	8	6.6
Low back	38	16.4	19	17.1	19	15.7

N=number of respondents

The gender distribution in the cohort was almost even: 111 men and 121 women. The majority of responding computer workers (88%)

was under 40 years old. Looking to occupational characteristics of studied population, we observed that the majority (95%) of computer workers

had a computer-working program over 4 hours per day .The data reflects the importance of computer work in actual economy. The data analysis revealed that the prevalence of WRMSC to computer workers of the cohort during the previous year was 47%. The gender prevalence was 38.7% to men and 54.5% to women. The 1-year prevalence of complaints for different localizations is show in Table 2.

We find the highest prevalence for cervical (neck) localization of WRMSC - 23.3% and the lowest prevalence for elbow localization - 1.7%.

The most frequent localizaton for men was low back (17.1%) and for women the neck (34.7%).

We present the results of individual and occupational factors analysis in table 3.

Table 3: The analisis of demographics and ocupational factors as risk factors

(Total number: 232 computer workers)

Variable	Total	With	Without	RR	CI	p
Gender						
Men	111	43	68			
Women	121	66	55	1,41	1,06-1,87	0.044
Age						
<40 years	180	77	103			
≥40 years	52	32	20	1.44	1.09-1.89	0.016
BMI						
≤25	157	70	87	1,17	0,88-1,54	NS
>25	75	39	36			
Physical activity						
Frequent	128	55	73	1,21	0,92-1,59	NS
Unsignificated	104	54	50			
Computer work						
< 4 hours/day	13	5	8	1,23	0,61-2,49	NS
≥4 hours/day	219	104	115			
Breaks duration						
< 5 minutes	26	17	9	1.44	1.10-1.89	0.022
≥ 5 minutes	206	92	114			

BMI= body mass index; RR= relative risk; CI= confidence interval; p value: NS= non significant, p≤0.05 statistically significant

The results shows as risk factors: being a woman and being over 40 years old.

More people with a BMI over 25 and with a low physical activity profile reported musculoskeletal complaints. Risk analysis has not statistical significance for overweight and sedentary people.

Daily computer work duration was not identified as risk factor by statistical analysis.

The lack of work breaks or the duration of breaks under 5 minutes was found as risk factor for computer work-related complaints.

We present the results of workstation factors analysis in table 4.

The risk analisys identified as risk factors: deficiencies in thermal comfort and ventilation of working rooms, deficiencies of the chair (unadjustable chair, lack of back rest and arm rest) and lack of postural comfort.

Table 4: The analysis of workstation factors as risk factors (Total number: 232 computer workers)

Factor	Total	With	Without	RR	CI	p-value
Lightening						
Correct	201	91	110			
incorrect	31	18	13	1.28	0,92-1,79	NS
Thermal comfort						
correct	190	80	110			
incorrect	42	29	13	1,64	1,26-2,13	0.001
Ventilation						
correct	157	65	92			
incorrect	75	44	31	1,42	1,09-1,85	0.013
Adjustable chair						
correct	191	82	109			
incorrect	41	27	14	1,53	1,17-2,02	0.007
Back rest						
correct	164	64	100			
incorrect	68	45	23	1,70	1,31-2,19	0.0001
Arm rest						
correct	180	74	106			
incorrect	52	35	17	1,64	1,27-2,12	0.0008
Frontal screen						
correct	190	92	98			
incorrect	42	17	25	0,84	0,56-1,24	NS
Frontal keyboard						
correct	221	107	114			
incorrect	11	2	9	0,38	0,11-1,33	0.04
Forarms rest						
correct	210	98	112			
incorrect	22	11	11	1,07	0,69-1,67	NS
Postural comfort						
correct	161	63	98			
incorrect	71	46	25	1,66	1,28-2,14	0.0003

RR= relative risk; CI= confidence interval; p value: NS= non significant, p≤0.05 statistically significant

DISCUSSIONS

The prevalence in the previous 12 month of WRMSC in studied population is comparable with the one from international studies presenting 20-40% prevalence of WRMSC to computer workers 6.

The higher rate of prevalence of musculoskeletal complaints to women was found in many studies 7,8. Szeto and all. show that during computer

work symptomatic female office workers demonstrate a trend towards higher cervical postural muscle load than asymptomatic office workers 9. This finding can explain the high prevalence of neck complaints to women as we found 34.7 %.

The augmentation of prevalence of musculoskeletal complaints with ageing, as in our study, can be explain

by physiological and pathological changing of musculoskeletal system correlate with age. Also, risk factor for musculoskeletal disorders are accumulated and have a long action in time.

The lack of work breaks or the duration of breaks under 5 minutes was found as a risk factor in many studies 1,10. The presence of breaks allow the worker to change position, to perform movements with a significant effect of muscle activities.

In this study we did not find the daily computerwork duration as a risk factor. Several previous studies considered work duration as risk factor but there are also studies with results similar to ours 10. The divergences can be related to the difficulty of exposure quantification. The accuracy of self-estimation is debatable, either by

overestimating or by underestimating the exposure.

Workplace and workstation were found as risk factors in several other studies 3,10 as in our own.

Limitations of this study are related to self reported data. For further studies pertaining this subject we intent to correlate the results of self-reported questionnaires with clinical examination of subjects and with an observative evaluation of working conditions.

Another aspect is the eterogeneity of jobs. There are diferencies between work organisation for several tasks performed by subjects. The amount of participants in this study did not allow a task-related statistical analisys. We intent to perform a further study for computer workers with the same job/task and for the same employer.

DISCUSSIONS

1. Work-related musculoskeletal complaints have a high frequency to computer workers, the most affected are women over 40 years aged.

2. Some circumstances and work conditions can be considered as risk factors: lack of or too short breaks, ergonomical deficiencies of workplace and workstation, postural discomfort. Identification of risk factor has applicability in occupational medicine. At a National and European level there

are clear laws regarding „minimum safety and health requirements for work with display screen equipment”.

3. The proposed self-reported questionnaire is useful for risk factor identification. Knowing the risk factors is critical for implementing the required ergonomic strategies in order to reduce their impact. Implementing the correct strategies can reduce the incidence and the impact of musculoskeletal complaints.

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FINANCING STRATEGIES FOR THE NATIONAL HEALTHCARE SYSTEM



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ABSTRACT

Worldwide, health care systems are undergoing constant change which address reducing dysfunctions of any kind in both democratic countries with a stable economy and countries which have had a state monopoly-based economy with a planned, centralized production system.

The drawbacks that generated this reform process of healthcare systems were present on all piers of society, from the end-users or patients to the doctors and health institutions, as well as public and administrative authorities. These drawbacks were caused by increases in health care budgets and spending without sustainability, without substantial results in the domain, an insufficient coverage of the population, the lack of efficient mechanisms for quality assurance, an exaggerated volume of daily work or managerial inefficiency.

Keywords: health care systems , the main ways of financing, financing strategies.

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INTRODUCTION

The health systems differ in Europe in both how they are organized and the ways they are financed, as well as through the final results that can be measured through the population's health state, financial protection against risks and, last but not least, the grade of satisfaction within the population. As such, health systems

need to be analyzed through a systemic viewpoint, going around personal and professional aspects that can stop the realization of a pragmatic evaluation.

The systemic approach of health systems cannot exclude the problem of financing, which is appearing more and more in debates relating to organizing the health systems.

MATERIAL AND METHOD

In Western countries, the health sector is considered to be a keystone to influencing economic growth, an element without which development of any kind is not feasible. As such, resources allocated to the health sector can be as high as 13-15% of the GDP, with the respective governments believing that the investment in health will be gained back into the economy as improvement in the health state of the population and more able work force.

In Romania, a comparative analysis from a regional, continental and international point of view is reflected in:

- The level of resources of which we benefit, reflected best in the GDP per capita indicator which, although has been growing in the past few years, place us under the regional and world average and up to five times lower than the continental average.

- The level of interest for healthcare, reflected best in the percentage of total spending for the health sector from the GDP, where with values of 3-4% in the last few years we are situated far behind regional countries (Poland 6,2% ; Czech Republic 6,8% ; Hungary 8,3%) or continental and international countries

(France 11,1% ; Switzerland 11,3% ; USA 15,3%).

The main ways of financing health systems in Europe are diverse, few countries using a single method of financing, diversifying the financing sources for the spending in the health care system:

- Financing from the state budget;
- Financing in the form of social insurance;
- Financing in the form of private insurance;
- Financing through direct payments;
- Regional financing (EU projects);

Practically speaking, the possibilities resulting from combining the above methods are varied and we can positively state that there are about as many financing systems in Europe as there are countries.

Although there were numerous studies and analysis regarding the effectiveness and performance of health care systems, there can be no one model that is agreed upon on a European level, mainly because each model has it's advantages and disadvantages and their comparison is difficult to achieve.

The 27th place occupied by the Romanian health care system, evaluated based on 34 criteria of performance and applied to a number of 31 European countries by the European Health Index obligate us to analyze the way other health care systems are organized.

The health care system in Romania, as it was inherited, is concentrated more so on curative interventions than on a system of integrated permanent services that are both curative and rehabilitating.

Sadly, the networks of health care providers in Romania are, at present, very unbalanced and generally do not respond to the needs of the population.

Primary or emergency assistance and dental medicine established clear coordinates of functioning. The emergency assistance service is still insufficiently defined, organized and evaluated, which influences other parts of the health care system, mainly hospitals. The strategy to transfer the majority of health care services from hospitals to the emergency assistance or general assistance service has to be followed by the regulation of

relationships between these complex structures as well as the regulation of the informational circuit and patient care.

The actual state of things is also the result of de-centralization processes which were however launched without a proper and realistic evaluation of the managerial capacity at a local level and without addressing the development of adequate instruments for problem solving, which were due to be resolved in the next system.

In parallel with these processes, the apparition of private actors increased the fragmentation within the system, accentuating inequality in distributing medical staff (the number of medics per capita decreased in rural areas compared to urban areas), and with an increased inequity of access to the medical system for poor patients.

All these aspects made possible the unfit financing of the Romanian health care system, both as a total value reported to the national GDP and in rapport to the types of medical assistance – hospital, ambulatory, family medicine, sanitary transport of medicine and materials.

RESULTS

The necessity of finding suitable financing strategies and possibilities which are superior to the existing ones cannot be put into question, even in the case of evolved health care and insurance systems. There are a number of strategies which are meant specifically to improve financing methods. These are, as follows:

- The existence of an exhaustive classification of all types of services;
- Using the same classification and methods of payment for ambulatory medicine services in

hospitals and other units except hospitals;

- Introducing a new classification of specialty ambulatory services which are more easily linked to the classification used for acute disease services (DRG classification), which has been put into place starting 2011.

- Cumulating some types of visits for some types of ambulatory services which necessitate repeated visits and which are defined by clinical approach;

- Cumulating “episodes” of afflictions in different units within the

system where this represents normal practice and using the idea of a management unit of these “episodes”.

- Using the same classification and payment formulas for some forms of non-acute hospital services (especially health-maintenance hospital services) where these needs for health services can be resolved in more than one unit.

An important aspect in finding a strategy of financing the health care system which best responds to the necessities is represented by the competition between the public and private sectors. The competition will not be lacking in risks and problems, but will have a generally positive influence on the quality and price of medical care, as long as the legal framework of the two sectors enforces the satisfaction of patients needs.

Basically, when creating financing strategies, one should regard the needs that the health care system needs to address. These needs can be quantified on three levels of responsibility:

- Minimal level – the minimum level of health care that each citizen of Romania should benefit from, regardless of the level of health insurance one pays;

- Social level – defining a base services pack which is offered and insured within the limit of social contribution to the national health insurance system;

- Private level – which covers everything that exceeds the social level and the basic services pack, this level being insured by private insurance firms.

CONCLUSIONS

With all the deficiencies of the Romanian health care system, the national effort for increasing and completing health care governance programs must be agreed upon by all actors – political, social, economic – which can help assuring the compatibility of the Romanian system with the European system and the European family that we are a part of.

Knowing that health care is guaranteed by the Constitution, but noting the chronic deficiencies of the public system and the difficulty of correctly responding to needs, a pragmatic approach is in order for developing a sustainable financing model.

As a result, a guarantee from the government and state appears necessary in regards to improving this fundamental right of the population which has to follow principles of social equity.

The only way of obtaining this guarantee is implementing insurance systems based on mandatory contributions, accompanied by a private health insurance sector.

The financial responsibility will have to be shared from this moment on between the central authority, the local authority and hospitals, while the lack of sustainable financing, the absence of accreditation criteria, of guides and medical practice protocols, the lack of the private sector and the lack of competition are all aspects that need to be taken into consideration.

Financing arrangements need to sustain the redistribution of resources towards accomplishing the new objectives and needs in the health care system, reducing financing barriers to the level of utilizing necessary services and protection against the financial risk of using assistance in a manner of financial responsibility.

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MANAGEMENT OF CHRONIC URTICARIA ASSOCIATED WITH AUTOIMMUNE THYROIDITIS



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ABSTRACT

Introduction: The presence of functional autoantibodies in some patients with chronic urticaria led to a new concept of autoimmune urticaria. Chronic urticaria characterized by recurrent episodes of mast cell-driven wheal and flare type skin lesions is often associated with thyroid autoimmunity. In this study we assessed the management of Romanian patients with chronic autoimmune urticaria and thyroid autoimmunity.

Materials and methods: During one year period we selected from adults patients with chronic urticaria (persistent symptoms more than 6 weeks), hospitalized at our Department of Allergy and Clinical Immunology, those poorly controlled with high doses of H1 antihistamines. Patients enrolled underwent autologous serum skin testing (ASST), after obtaining written informed consent. All sera were assayed for anti-thyroid-peroxidase (anti-TPO) antibodies, thyroid stimulating hormone (TSH) and thyroid hormones, and immunoassay tests for serological markers HCV, HBV and HIV were carried out, due to ethical considerations. Cutaneous disease activity was evaluated using urticaria activity score (UAS). The effectiveness of H1 antihistamines was assessed later after four weeks of treatment, this being adjusted according to UAS.

Results: The study group included 238 patients with chronic urticaria. 63 patients of these had positive autologous skin test and elevated levels of anti-TPO antibodies. Because of high values of UAS, all patients received high doses of oral H1 antihistamines. After four weeks of treatment, 29 patients had still high UAS values and L-thyroxine was added to the therapeutic schedule, with improvement of the skin manifestations of urticaria. Only seven patients after four weeks of combined therapy had high UAS and required short course of systemic corticosteroid.

Conclusion: Pharmacological treatment of patients with chronic urticaria associated with autoimmune thyroiditis is often difficult, requiring high doses of H1 antihistamines. Initiating hormonal treatment improves sometimes urticaria control. Nevertheless some cases required short course of systemic corticosteroids.

Key words: chronic urticaria, autoimmune thyroiditis, H1 antihistamines

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INTRODUCTION

Urticaria is characterized by urticarial wheals of varying sizes, with reflex erythema, associated with itching or burning, and occasionally with angioedema. Urticarial wheals appear rapidly and resolves within 1-24 hours without residual lesions. Chronic urticaria (CU) is defined by spontaneous wheals persisting for a period of at least six weeks (Zuberbier et al, 2009a; Zuberbier, 2012). According to the recent international guidelines for the management of chronic urticaria, the first-line treatment is the new generation, non-sedating H1-antihistamines, and if standard dosing is ineffective, increasing the dosage up to four-fold is recommended (Zuberbier et al, 2009b; Chow, 2012).

A subset of CU patients had been recently classified as having autoimmune urticaria, considering the association of anti-IgE and/or anti-IgE receptor antibodies with thyroid autoimmunity (Maurer et al, 2011). Therefore, autoimmune mechanisms in CU (Posthumus et al, 2012) are important. The mentioned recent guidelines indicate that the incidence of autoimmune urticaria is about 30-50% of CU and may be associated with other autoimmune conditions, especially autoimmune thyroiditis. At least one-third of all cases of CU are of an autoimmune nature, with the possible association of thyroid autoimmunity with or without clinically manifestations of hypothyroidism. In addition to the presence of antithyroid antibodies

(more frequent than in the general population), these patients may have IgG antibodies targeted against circulating IgE or (much more often) against the epsilon subunit of the IgE high-affinity receptor (FcεR1). The presence of such antibodies can be evaluated by intradermal testing with autologous serum, the autologous serum skin test (ASST) (Konstantinou et al, 2009).

Early studies on the association of autoimmune thyroiditis with chronic urticaria have shown higher frequency of Hashimoto thyroiditis (Leznoff et al, 1989). The incidence of abnormal thyroid function, with either increased or decreased values of thyroxine levels, or increased or decreased thyroid-stimulating hormone levels, or both, was $12 \pm 19\%$ (Kandeel et al, 2001). A detailed study about the presence of autoantibodies in patients with CU revealed that autoantibodies to thyroid peroxidase were found significantly more common in urticaria (20%) than in controls (0%), but broad non-specific autoimmunity was not found (Ryhal B et al, 2001). There are large studies on the association of CU with autoimmune thyroiditis (Zauli D et al, 2002). Many patients with CU have a positive autologous serum skin test (ASST).

The aim of this study is to assess the optimal pharmacotherapeutical schedule in patients with chronic urticaria with positive-ASST associated with autoimmune thyroiditis, in order to control their cutaneous disease.

MATERIAL AND METHOD

From 238 subjects referred to the hospital "Nicolae Malaxa" allergy

clinic, during a 12-month period for evaluation of chronic urticaria (CU),

defined as urticaria with a more than six-week duration, we selected a group poorly controlled with a high doses of oral new-generation H1 antihistamines and we performed autologous serum skin test (ASST) and screening for anti-thyroid peroxidase (anti-TPO) antibodies, suggestive for Hashimoto thyroiditis. Thyroid-stimulating hormone (TSH) and thyroid hormones levels were also determined in these patients.

ASST was performed according to EAACI/GA2LEN task force consensus report guidelines. Autologous serum was obtained by centrifugation from venous blood (cubital vein) in sterile tubes without clotting accelerator, allowed to clot for 30 min. 50 µL samples of autologous serum and 0.9% saline (from sterile individual vials) were separately injected intradermal into volar forearm exposed upward,

with the 29-gauge needle, at 15-degree angle at least 3-5 cm apart. H1 antihistamines were withdrawn at least two days and systemic corticosteroids for one month. ASST was considered positive if erythematous papule diameter was at least 1.5 mm higher than the control test at 30 min, and strong positive in case of a diameter difference of 5 mm. Due to ethical issues, screening for HIV-1 and -2, HBV and HCV serological markers were performed in all patients, with written informed consent previously obtained.

Clinical monitoring of disease activity was performed by using urticaria activity score (UAS) of 0-6 points, depending of the daily number of wheals (none=0; <20=1; 21-50=2; >50/large, confluent=3) and the intensity of pruritus (none=0; mild=1; moderate=2; intense=3) (Table 1) (Zuberbier et al, 2009a).

Table 1. Assessment of disease activity in patients with urticaria .Sum of score: 0-6 (after Zuberbier et al, Position paper EAACI/GA²LEN/EDF/WAO guideline, 2009)

Score	Wheals	Pruritus
0	none	none
1	mild (<20 wheals/24 h)	mild (present, but not annoying or troublesome)
2	moderate(20-50 wheals/24 h)	Moderate (troublesome, but does not interfere with normal daily activity or sleep)
3	intense (>50 wheals/24 h or large confluent areas of wheals)	Intense (severe pruritus, which is sufficiently troublesome to interfere with normal daily activity or sleep)

Patients included in the study were assessed to have normal test results, such as complete blood counts, erythrocyte sedimentation rate, urinalysis, stool examination, negative hepatitis viruses and HIV serology (immunochromatographic tests). In addition, patients selected had normal values for rheumatoid factor (RF) (immunonephelometry); anti-double-stranded DNA antibody (anti-dsDNA, latex agglutination), and complement C3 and C4 serum values (immunonephelometry) were normal. Patients evaluated in the study had high serum levels of anti-thyroid

peroxidase (anti-TPO) antibodies and positive autologous serum skin test. Free thyroxine (FT4) levels (normal, 0.7-1.48 ng/dL) and thyroid-stimulating hormone (TSH) levels were measured by chemiluminescent assays. The normal reference range for TSH was 0.35-4.94 µg/dL. Anti-thyroid peroxidase (anti-TPO) antibodies were determined also by chemiluminescent assay. The presence of anti-TPO antibodies and, in addition thyroid dysfunction, were considered criteria for the status of autoimmune thyroid disease. The diagnosis of hypothyroidism was established by

clinical and laboratory criteria of FT4 < 0.7 ng/dL, TSH > 4.94 µg/dL. Patients were classified as having subclinical hypothyroidism if they were clinically euthyroid with normal FT4 levels, but had significantly elevated TSH levels. The diagnosis of hyperthyroidism has been based on the detection of low serum TSH values (< 0.35 µg/dL) and elevated serum levels of FT4 (> 1.48

ng/dL). The study was conducted over a period of eight weeks, including three visits. At each visit patients were monitored by determining the urticaria activity score (UAS). All patients with thyroid disease or subclinical thyroiditis, during the second visit were endocrinological evaluated in order to establish the dose of L-thyroxine required for each patient.

RESULTS

We evaluated 238 adult subjects with chronic urticaria, with a mean age of 43.19 ± 15.4 years (limits 18; 82 years), from which 70.16% were females (Figure 1).

The group with CU was selected from patients having no detected etiological cause. No collagen tissue disease was suspected in this group using clinical and immunological parameters. The mean duration of urticaria was 30.35 ± 24.11 months, and patients were treated with standard or high doses of oral non-sedating H1

antihistamines. 133 patients (55.88%) were evaluated having a UAS score greater than 3 points during pharmacotherapy and positive ASST (Figures 2 and 3), from which we detected sixty-three patients (47.36 %) having increased levels of anti-TPO antibodies (figure 4), thirty-four had Hashimoto's thyroiditis with euthyroid status (25.56%), twenty had subclinical hypothyroidism (15.03%), and nine patients have clinical manifestations of hypothyroidism (6.76%) (Figure 5) (Table 2).

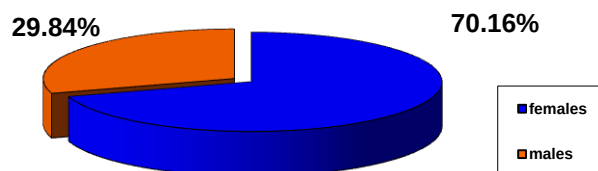


Figure 1. Sex ratio to patients with chronic urticaria (n = 238) one year period (orange % males; blue % females)

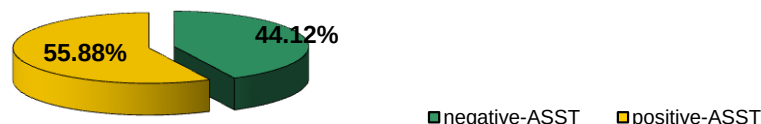


Figure 2. Percentage of patients with positive ASST (n=133 from total patients=238)



Figure 3. Positive autologous serum skin test (ASST)

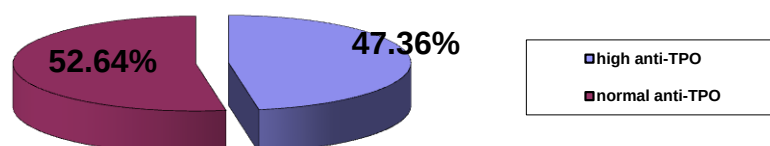


Figure 4. Percentage of patients with increased ATPO in the group with positive-ASST

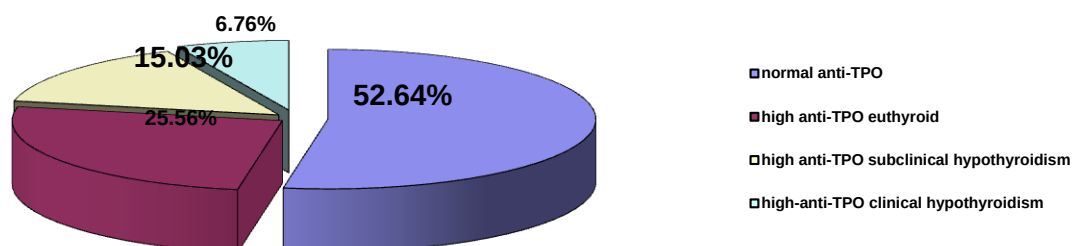


Figure 5. Percentage of patients with thyroid disease from the patients with ASST positive

Table 2. Frequency of anti-TPO antibodies and thyroid status in patients with ASST-positive chronic urticaria

Patients	ASST	high anti-TPO	Euthyroidism	Subclinical hypothyroidism	Clinical hypothyroidism
133	positive	63 (47.36%)	34 (25.56%)	20 (15.03%)	9 (6.76%)

All sixty-three patients were included in the study and had UAS greater than 4 points. The values of anti-TPO antibodies ranged between 8 UI/mL and 1000 UI/mL, with a mean value of 171.58 UI/mL $\pm$ 220.82 UI/mL.

RF and anti-dsDNA antibodies were found to be negative in all patients. The group of patients included in the study consisted of 50 women and 13 men, aged between 19 and 79 years (mean age was 45.87 $\pm$ 16.74 years) (Figure 6).

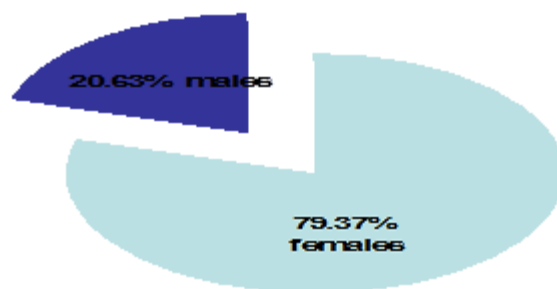


Figure 6. Sex ratio in patients with positive ASST and high values of anti-TPO antibodies
(total number of patients= 63)

At the first visit, 38 patients had UAS value of four points (30 euthyroid patients with and 8 with subclinical thyroiditis), and 25 patients had UAS of five points (4 euthyroid patients, 12 with subclinical thyroiditis and 9 with clinical thyroiditis) (Figure 7). Patients included in the study (sixty three) were treated with antihistamines H1 at high doses (15 mg of levocetirizine or desloratadine or 30 mg of cetirizine) for four weeks. At the second visit, after four weeks of treatment with high doses of antihistamines, patients were reassessed on the urticaria activity score. Of the 63 patients, 34 patients

had UAS of one point (28 of patients with euthyroid, 4 of those with subclinical thyroiditis and two with clinical thyroiditis) and 29 patients had UAS of three points (six of patients with euthyroid, sixteen of those with subclinical thyroiditis and seven with clinical thyroiditis) (Figure 7). Patients with high score of UAS and increased level of TSH, had received additional treatment with 50 micrograms of L-thyroxine for four weeks. On the third visit, only seven patients maintained a high score of urticaria activity, requiring short course of systemic corticosteroids (Figure 7).

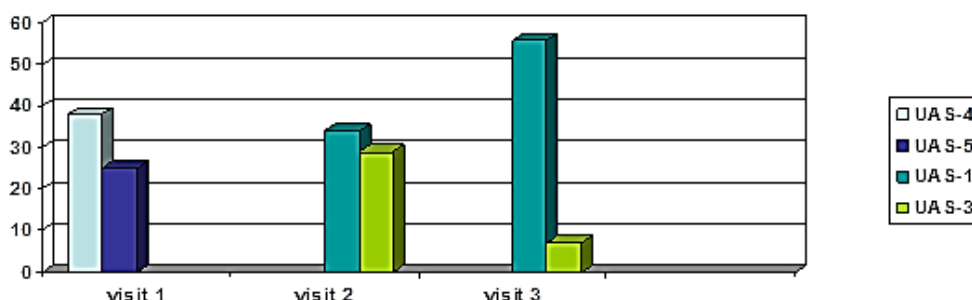


Figure 7. Evolution of UAS values with H1 antihistamine pharmacotherapy

Our study revealed that the treatment of patients with autoreactive urticaria associated with autoimmune

thyroiditis is difficult, requiring high doses of H1 antihistamines. Often initiating hormonal treatment improves

urticaria control, however some cases need short course of systemic corticosteroids. Thyroid hormone levels and autoimmune thyroiditis status in patients with increased levels of anti-

TPO antibodies were variable, thyroid hormone free T4 levels have been between 0.42 and 1.44 ng/dL and TSH ranged between 1.33 and 5.6 microUI/mL (Table 3).

Table 3. Thyroid function tests in patients with increased values of anti-TPO antibodies

Group	Euthyroidism	Subclinical hypothyroidism	Hyperthyroidism	Clinical hypothyroidism	FT ₄	TSH
	n	n	n	n	mean $\pm$ SD	mean $\pm$ SD
+ASST	34	20	0	9	1.054 $\pm$ 0.275	4.348 $\pm$ 1.027

DISCUSSIONS

The significant high prevalence of females and the prevalence of the ASST positivity were consistent with results of similar studies (Asero R, 2003). It is well known that autoimmune conditions have a higher prevalence in females. The most striking sex differences are observed in Sjogren's syndrome, systemic lupus erythematosus, autoimmune thyroid disease (Hashimoto's thyroiditis and as Graves' disease) and scleroderma, all of these representing the spectrum of diseases in which women population is greater than 80% (Fusari et al, 2005).

The prevalence of the positive ASST in patients with comorbidity urticaria-thyroiditis was lower to that reported in a previous study (56%), but higher than that reported by other authors (25%) (Fusade et al, 2001).

The association of CU with thyroid autoimmunity has been known since two decades ago, but its frequency seems to be variable in different reports. The prevalence in series ranges from 12% to 33% (Fusade et al, 2001). More recently, some studies have suggested that there may be a link between CU and thyroid autoimmunity

(Gaig et al, 2000). Our study revealed a higher frequency of autoimmune thyroiditis in the group of patients with positive ASST, compared to those with CU, but with negative ASST, thus suggesting a connection between the two conditions and explaining why the response to systemic glucocorticosteroids seems to be better. We detected thyroid autoantibodies in 47.36% of patients with autoimmune CU and this may be considered a relatively high percentage. The frequency of thyroid antibodies in the control group was 4.76%, when comparing with the previous studies (0-5.6%) (Verneuil et al, 2004). TSH levels were increased in 21.80% of patients with ASST-positive CU (autoimmune CU), compared to the group having negative ASST (0.95%).

Thyroid function tests are not sufficient to rule out thyroid disease, and thyroid antibody tests should be carried out in all patients with autoimmune CU. Our study revealed a high incidence of the present of anti-TPO antibodies in patients with autoimmune CU, compared with those who had negative ASST. We consider

that often it's just a matter of time before thyroid dysfunction will have clinical manifestation, and more studies are required regarding this aspect.

While the association of CU and thyroid autoimmunity is not completely understood, the potential use of thyroxine in the treatment of CU in patients with thyroid autoimmunity is even less well established. There are conflicting reports on the results of such hormonal therapy. Treatment with thyroxine was reported to alleviate the symptoms of urticaria in some cases, with a concomitant decrease in anti-thyroglobulin antibodies. Some reports also advocated that patients with CU should be screened for evidence of thyroid autoimmunity and that a trial of thyroxine therapy for those who have thyroid autoimmunity can contribute to clinical improvement by

the suppression of chronic thyroid stimulation. In this study 75.86% of patients treated with levothyroxine had improving of the urticaria activity score. All of them confirm the difficulties to treat these patients. We need more studies on the usefulness of hormonal therapy in such patients.

We consider that our data are consistent with the new European guidelines for patients with CU, which recommend evaluation for autoimmune thyroiditis, and underline the role of performing ASST in selected Romanian CU patients (Popescu FD et al, 2008). This study and previous results (Tudose et al, 2010) offer original data for Romanian patients presenting this association of autoimmune disorders, considering that genetic predisposition also plays an important role in such immune dysregulation conditions.

CONCLUSIONS

Screening for thyroid autoimmunity and thyroid function is advisable in all patients with chronic urticaria presenting positive ASST, considered autoimmune or autoreactive

CU, for an early identification of patients requiring specific treatment of underlying thyroid dysfunction, for a better control of CU with oral H1 antihistamines and a proper follow-up.

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INTERVAL EXERCISE TRAINING EFFECT ON LOWER BODY MUSCULAR PERFORMANCE IN PATIENTS WITH METABOLIC SYNDROME



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ABSTRACT

Aim: The present study is aiming to evaluate the benefit of an intensive interval exercise training programme on lower body muscle performance in young patients with metabolic syndrome. Materials and methods: Twenty-four young metabolic syndrome patients participated in a 9 months intensive exercise training study. All subjects underwent measurements of explosive force and power of the lower limbs by performing the Counter movement jump test and isometric muscle strength evaluation. All subjects participated in a 9 months interval exercise training programme on bicycle ergometer, stepper, crosstrainer and treadmill. Results: We noticed at the end of the study a significant improvement in explosive power and force of the lower body along with a significant increase in the segmental isometric strength of the trunk and lower extremities muscle groups. Conclusions: Intensive interval exercise training programmes improve the muscular performance of the lower body in young metabolic syndrome patients and may be the premise for future increase in ambulation and daily physical activity of these patients.

Key words: interval exercise training, muscular performance, isometric strength

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INTRODUCTION

Metabolic syndrome (MetSyn) is a combination of medical disorders (impaired glucose metabolism, elevated blood pressure, hypertriglyceridemia, low HDL cholesterol and central obesity) that, when occurring together, increase the risk of developing cardiovascular disease and diabetes.¹ Epidemiological studies shown that the prevalence of MetSyn in the USA is estimated to 25% in the general population, and prevalence increases with age.²

Sedentary lifestyle is associated with development of cardiometabolic risk factors in young adults.³ Different studies have shown that, at any age, the number of cardiometabolic risk factors is inversely related to physical activity and physical fitness.^{4,5}

We observed in our research clinical study that despite the

significant increase in weight of the young metabolic syndrome patients, the muscle mass and strength of the lower body is decreased. (Figure 1) This may be due to the fact that, even for ambulation purposes an increase weight require increased muscle mass and strength of the lower body, this patients have an extreme sedentary lifestyle (our personal investigations shown that they perform in average only 1200 steps daily, 88% less than necessary for a physically active lifestyle).

Aim

The present study is aiming to evaluate the benefit of an intensive interval exercise training programme on lower body muscle performance in young patients with metabolic syndrome.

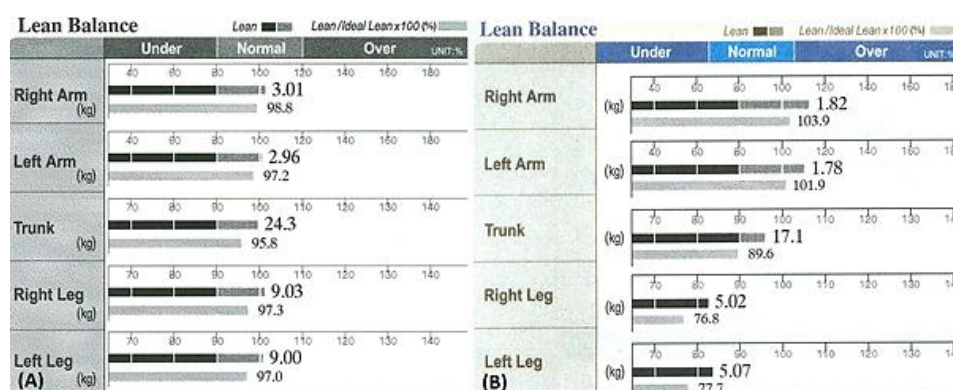


Figure 1. The lean body mass profile of a normal weight subject (A) and obese metabolic syndrome patient (B). Good lean balances require to be in the normal range and all graph bars should be similar in length. Notice the reduced lean mass on the trunk and lower extremities in the obese patient (small bars corresponding to the trunk, left and right leg)

MATERIAL AND METHOD

Twenty-four young metabolic syndrome patients participated in a 9 months intensive exercise training programme. The study patients were free of cardiac and pulmonary disease and presented a normal tensional

response to the exercise. All subjects underwent measurements of explosive force and power of the lower limbs by performing the Counter movement jump test (using Myotest system, Switzerland) and Isometric muscle

strength evaluation with the help of a digital dynamometer (Chatillon LBF 200, USA). We evaluate the patients at baseline and after 3 and 9 months of interval exercise training. We also performed a follow-up evaluation of patients after 18 months.

Each patient performed an incremental cardio-pulmonary exercise tests (CPET) at baseline. Three hours after a light breakfast, each subject performed a CPET (breath by breath spiroergometer device - Cortex Metalyzer 3B, Germany and an electronically braked cycle ergometer - Lode Corival, The Netherlands) up to exhaustion in order to determine his maximal oxygen uptake and the anaerobic threshold. The CPET results were used for individualization of exercise intensity in each patient.

Exercise training: All subjects participated in a 9 months interval exercise training programme consisting in 3 times per week of 40 minutes at extensive and intensive endurance intensity zone (in the range of anaerobic threshold), completed by 1 minute interval in development intensity zone (between anaerobic threshold and respiratory compensation point) for every 5, 4 or 3 minutes of training. The programme took place mainly indoor using workload devices (cycle ergometer, cross-trainer, stepper, treadmill) which involves large muscle mass. Each training sessions was supervised, recorded, and computer analyzed using Polar RS800 heart rate monitors

and a professional training software (Polar ProTrainer5 v.5.1, USA), in order to adjust the intensity and duration of the exercise intervals.

During exercise training sessions, patients were supervised and encouraged to continue by a personal trainer (chosen from the master degree students from Physical Education and Sport Faculty, no more than 4 patients per trainer). The role of the personal trainer was to: teach the patient the correct running and breathing pattern, set the right workload for the fitness devices and analyze the training sessions using the Polar ProTrainer5 software.

Ethical procedures: Our study obtained the approval of Local Research Ethics Committee.

The study was conducted in accordance with the guidelines in the Declaration of Helsinki and was formally approved by the Ethical Committee of the west University of Timisoara. All participants in the research study received information about the protocol and written informed consent was acquired.

Statistics: Continuous variables are presented as mean and standard deviation. Change from baseline to follow-up within treatment groups were tested using ANOVA Single Factor Test. The level of statistical significance was set at $p \leq 0.05$. The statistical analyses were performed with "GraphPad Prism v.5" for Windows.

RESULTS

We noticed at the end of the study a significant improvement in explosive power and force of the lower body along with a significant increase in the segmental isometric strength of

the trunk and lower extremities muscle groups. The progression of lower body muscular performance during the 9 months of study and on 18th months

| follow-up is presented in Table I and | Figure 2 to 5.

Table I. Trend of muscle performance parameters during the 9 months of study and at 18 months follow up.

Parameters	Baseline	3 months	9 months	18 months follow-up	P value
Explosive power (W/Kg)	39.80 ± 7.12	42.99 ± 7.65	42.78 ± 8.44	42.70 ± 8.81	= 0.002
Explosive force (N/Kg)	22.26 ± 3.05	24.33 ± 3.05	24.10 ± 3.27	24.28 ± 3.93	< 0.001
Isometric strength (Kg):					
– Trunk flexion	16.04 ± 7.18	16.92 ± 6.66	17.46 ± 6.51	17.83 ± 6.40	= 0.001
– Trunk extension	15.18 ± 6.66	15.89 ± 6.51	16.46 ± 6.12	16.96 ± 6.01	= 0.001
– Hip flexion	24.96 ± 6.05	28.82 ± 7.01	29.41 ± 5.84	29.92 ± 6.15	< 0.001
– Hip extension	22.66 ± 4.82	28.08 ± 6.66	29.33 ± 5.36	29.83 ± 5.83	< 0.001
– Knee flexion	17.55 ± 5.02	20.94 ± 5.13	21.52 ± 5.24	21.45 ± 5.53	< 0.001
– Knee extension	25.70 ± 4.80	29.68 ± 5.92	30.33 ± 5.62	30.42 ± 5.99	< 0.001

Values are presented as mean ± standard deviation.

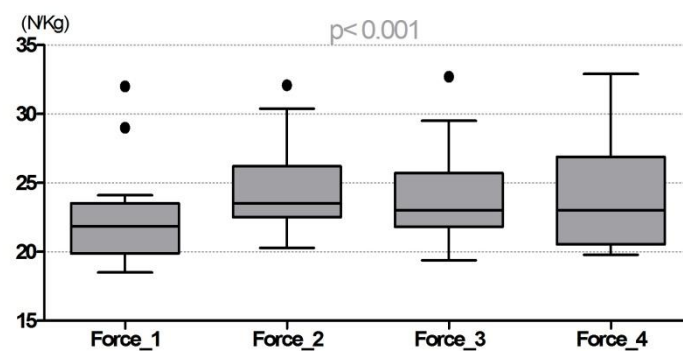


Figure 2. Trend of lower body explosive force during the 9 months of exercise programme and at 18 months follow up.

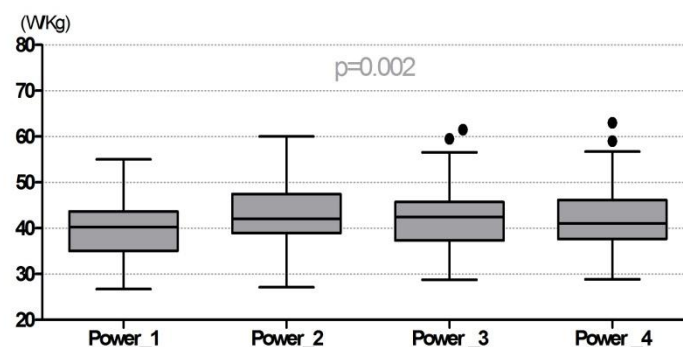


Figure 3. Trend of lower body explosive power during the 9 months of exercise programme and at 18 months follow up.

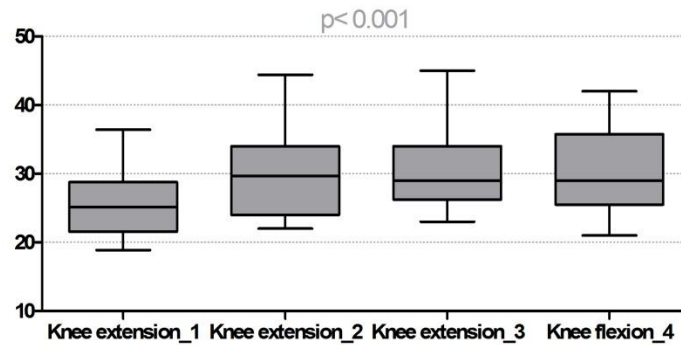


Figure 4. Trend of isometric strength developed at knee extension during the 9 months of exercise programme and at 18 months follow up.

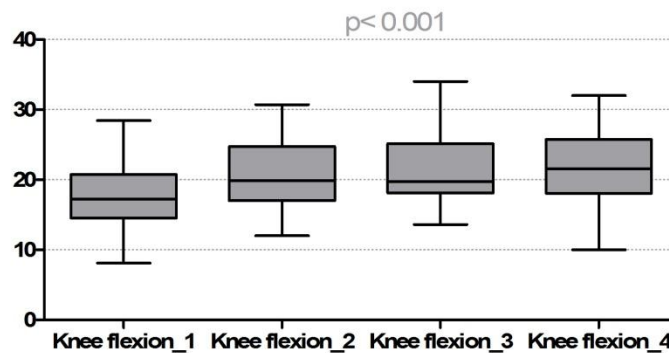


Figure 5. Trend of isometric strength developed at knee flexion during the 9 months of exercise programme and at 18 months follow up.

DISCUSSIONS

Beside negative influence of excessive weight on cardiometabolic risk, obese patients usually suffer from a general sense of fatigue which affects activities of daily living and work performance.⁶⁻⁸

Sedentary lifestyle, associated diseases and chronic pain, as well as poor self-esteem are some of the main determinants of higher fatigability suffered by obese subjects as a consequence of excessive fat mass.^{6,9}

Studies show that obese patients have physical limitations due to a reduction of both aerobic and anaerobic capabilities.^{10,11} While aerobic

capabilities depends on oxygen uptake and the level of anaerobic threshold, the anaerobic capabilities depends more on muscular mass and performance and is related to the accomplishment of short and vigorous movements more directly involved in everyday life activities (running in a danger situation or rapid climbing stairs) Obesity itself influence muscle mass trophism through predisposing the subject to physical inactivity and a reduced growth hormone secretion.^{12,13}

We demonstrated in the present study that a supervised exercise

training programme may increase the trophism and performance of lower body mass which facilitates the activities of daily living and work performance. The increase in muscular performance is much greater in the first three months which may suggest that even a short period of training brings important benefits in term of lower body muscular performance. After 18 months from baseline the benefit is still

present (the 9 month results are preserved at 18 months). This may be explained by the increased daily physical activity of these patients after the first 9 months of supervised exercise training (the patients were recommended to perform a daily session of 30 minutes brisk walking in order to preserve the muscular benefit and further decrease the cardiometabolic risk).

CONCLUSIONS

Intensive interval exercise training programmes improve the muscular performance of the lower body in young metabolic syndrome patients and may

be the premise for future increase in ambulation and daily physical activity of these patients.

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PREVALENCE OF REFRACTIVE ERRORS IN SCHOOLCHILDREN IN RURAL ENVIRONMENT



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ABSTRACT

The main aim of this study is to establish the refractive errors prevalence in rural schoolchildren from Arad county.

Materials and Methods: We have examined 612 pupils aged 6 to 11 years enrolled in elementary classes of 5 schools from Arad rural environment during January - March 2012. We have investigated the following parameters: age, sex, objective refraction and visual acuity. Refraction was measured with Potec 5000 autorefractokeratometer under cycloplegia which was obtained with cyclopentolate 4 times in one hour. Myopia was defined as refractive errors of at least -1.0 SD, hyperopia +1,5 SD and astigmatism 1.0 CD.

Results and discussions: We found 185 pupils with refractive errors out of which 31 cases of myopia, 65 of hyperopia, and 89 cases of astigmatism. Eighty pupils were diagnosed de novo with refractive pathology. Seventy-six subjects didn't wear any correction despite their pathology.

Conclusion: The refractive error with the highest prevalence is astigmatism, followed by hyperopia and myopia. The prevalence of astigmatism was higher in female (67.42%) than male subjects (32.58%) [$p < 0.0001$] and the prevalence of hyperopia was higher in male (63.08%) than females (36.92%) [$p < 0.005$]. Elementary schoolchildren are a high risk group for developing refractive errors.

Key words: refractive errors, children, rural environment, amblyopia, myopia, hyperopia, astigmatism

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INTRODUCTION

Childhood visual impairment due to refractive errors is one of the most common problems in schoolchildren and second leading cause of treatable blindness(6). Most of the children with uncorrected refractive errors are asymptomatic and hence screening helps in early detection and timely interventions. In countries with high attendance schools (like Romania), integration of vision screening within screening for other health issues is recommended. (1) However, differences in the availability of access to eye care services and even the magnitude of refractive errors between rural and urban students are not considered. (2) In this study we focus on the children in rural environment. Future studies will discuss rural ophthalmic pathology in preschool- and schoolchildren and the differences between the two environments. Refractive error is one of the most common causes of visual impairment around the world and the second leading cause of treatable blindness. (6) In a study, Bucsa D and collaborators concluded that the most common disorders in preschool- and schoolchildren are refractive errors. (5)

Reliable data on prevalence and distribution of refractive errors from population-based surveys are needed to plan cost-effective programs devoted to the reduction of visual impairment and blindness. Undiscovered and untreated refractive errors are an important cause of low visual acuity or amblyopia. We found little recent data in the literature regarding the prevalence of myopia,

hypermetropia and astigmatism at schoolchildren in Romania. Therefore, our objective is to determine the prevalence of this pathology in rural children population. We must underline the importance of the screening of refractive errors because of the negative consequences that result from the early misdiagnosis of these health problems. Amblyopia or lazy eye and its risk factors, is a decrease in visual acuity resulting from abnormal visual development in children, and is a major public health problem. Amblyopia is the most common cause of monocular or in some cases binocular vision loss in infants and young adults (7). Amblyopia affects approximately 2-4% of the population (8). Most cases are associated with eye misalignment, usually esotropia in infancy or early childhood (9-10). Less frequently, anisometropia [difference in refractive error between the two eyes] or a combination of strabismus and anisometropia are causally associated with amblyopia. In children under 7 years, amblyopia was associated with strabismus in 38% of cases, with anisometropia in 37% of cases and with both strabismus and anisometropia in 24% of cases (11). In the present work, prevalence and pattern of refractive errors (myopia, hyperopia, astigmatism) among school children in Arad has been studied for planning appropriate eyecare programmes to reduce the burden of visual impairment among younger population in this area.

MATERIAL AND METHOD

The study was conducted between January and March 2012.

Verbal consents of school director, teachers and parents were obtained for

screening the children. The research protocol adhered to the provisions of the Declaration of Helsinki for research involving human beings.

Target group size was calculated by the means of Kish and Leslie's formula for an expected prevalence of 30% with confidence limit of 5% and confidence level 99%.

We have examined 612 pupils aged 6 to 11 years enrolled in elementary classes of 5 schools in Arad county rural environment. There was no acute pathology that would have influenced refraction. The distant vision of a child was tested utilizing Snellen's Illiterate 'E' chart. The visual acuity was tested with the chart at 6 meters. If uncorrected vision was <0.6 in either eye, the child was declared to have defective vision. A cover-uncover test was then performed to confirm the diagnosis of strabismus. If eyes moved after removal of the cover, the child was considered to have a "phoria"; and if the degree of deviation did not change on cover and uncover, the child was considered to have a "tropia" [> 5 degree / 10Δ diopter (D)]. The eye movements were tested in 6 cardinal directions to rule out paralytic or restrictive strabismus. Anterior segment was examined with flashlight to detect cataract; congenital anomalies

like anophthalmos, microphthalmos, large corneas; and evidence of previous eye surgery. Objective refraction was measured with Potec 5000 autorefractometer under cycloplegia which was obtained with cyclopentolate 1% 4 times in 1 hour. This procedure was applied to all children, regardless of visual acuity.

Statistic analysis was conducted with Epi Info 7.

Emmetropia was defined as a spherical equivalent between -1.00 and +1.00. Myopia was considered when the measured objective refraction was more than or equal to -1.0 spherical equivalent diopters in one or both eyes. Hyperopia was considered when the measured objective refraction was greater than +1.50 spherical equivalent diopters in one or both eyes provided no eye was myopic. Astigmatism was considered to be visually significant if ≥ 1.00 D. Results are presented in tables and charts below.

All children with uncorrected refractive error were given low cost spectacles. Children with eye diseases were further examined and managed at the base clinic free of charge. The study results were shared with the scientific fraternity and policies for improving eye care of children were proposed.

RESULTS

We found the following results: out of the total of 612 children examined, 427 (69.77%) were emmetropic and 185 (30.23%) were found with refractive errors (ametropic). There were 31 (5.06%) cases of myopia, 65 (10.62%) of hypermetropia and 89 (14.54%) cases of astigmatism. Results are shown in Table 1. This means that 30.23% of

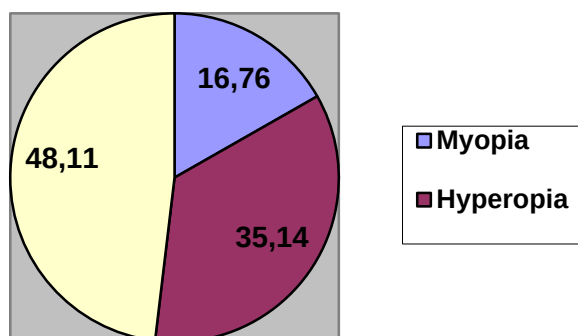
children from rural environment included in the study have ophthalmic refractive pathology 5.06% have myopia, 10.62% have hypermetropia and 14.54% have astigmatism.

Chart 1 shows the proportion of the different types of refractive errors. Myopia represents 16.76%, hyperopia 35.14% and astigmatism 48.11% of discovered refractive errors.

TABLE 1. Number of children and distribution of refractive errors over classes

Class	No. pupils	Total refractive errors	Myopia	Hyperopia	Astigmatism
I.	147	38	9	12	17
II.	124	44	5	15	24
III.	168	47	10	18	19
IV.	173	56	7	20	29
Total	612	185	31	65	89

CHART 1. Proportion of the three types of refractive errors



In this study we examined 289 (47.22%) male and 323 (52.78%) female children. We discovered 17 (54.83%) cases of boys and 14 (45.17%) cases of girls with myopia. There is no statistically significant difference between sexes in myopia. We discovered 41 (63.07%) cases of boys and 24 (36.93%) cases of girls with

hyperopia. We discovered 29 (32.25%) cases of boys and 60 (67.75%) cases of girls with astigmatism. Prevalence of astigmatism was higher in girls (67.75%) than boys (32.25%) [$p < 0.00001$], while hypermetropia was more prevalent in boys (63.07%) than in girls (36.93%) [$p < 0.005$]. Data are displayed in Table 2.

TABLE 2. Distribution of refractive errors over sexes

	Pupils	Myopia	Hyperopia	Astigmatism	Refractive errors
Male	289	17	41	29	87
Female	323	14	24	60	98
Total	612	31	65	89	185

TABLE 3. Newly and neglected refractive errors distribution

	No. cases	Procent (%)	Myopia	Hyperopia	Astigmatism
No of pupils	612	100			
Total refractive errors	185	30.23	31	65	89
Newly discovered refractive errors	83	13.56	12	23	48
known and uncorrected refractive errors	71	11.6	11	19	41

Out of the total number of 612 children examined, 185 (30.23%) were found with refractive errors. Eighty-three (44.86%) children were newly discovered with ophthalmic refractive pathology and 71 (38.37%) didn't wear

optical correction although they knew about their condition. Hence, 154 pupils overall didn't wear optical correction for their ophthalmologic pathology, because either they didn't know about it or they were not

compliant with the treatment. Thirty-one (5.06%) of the 612 children examined wore optical correction at the time the study was conducted. We found 12 (6.48%) new myopia cases, 23 (12.43%) new hyperopia cases and 48 (25.94%) new astigmatism cases. The number of new cases, expressed as percentage of total number of children examined, was as follows,: 1.96% myopia cases, 3.75% hyperopia cases and 7.48% astigmatism cases.

We found 11 (5.94%) known and neglected myopia cases, 19 (10.27%) known and neglected hyperopia cases and 41 (22.16%) known and neglected astigmatism cases. The number of known and neglected cases, expressed as percentage of total number of children examined, was: 1.89% myopia cases, 3.10% hyperopia cases and 6.70% astigmatism cases. 31 (5.06%) of the 612 children examined wore optical correction at the time the study was conducted. Results are shown in Table 3. Considering each type of refractive error we have 38.70% new myopia cases, 35.48% known and neglected myopia cases, 35.38% new hyperopia cases, 29.23% known and neglected hyperopia cases 53.93% new

astigmatism cases and 46.07% known and neglected astigmatism cases. 74.19% of the children with myopia, 64.61% of the children with hyperopia and 100% of the children with astigmatism didn't wear optical correction at the time of examination because either they didn't know about their pathology or they have shown low compliance with the treatment. Related to the total number of children examined, we found 3.76% untreated myopia cases, 6.86% untreated hypermetropia cases and 14.54% untreated astigmatism cases. Statistically significant differences can be seen between myopic and astigmatic cases (3.76% and 14.54% $p < 0.00001$) and between hyperopic and astigmatism cases (6.86% and 14.54% $p < 0.00001$). There was no statistically significant difference between hypermetropic and myopic cases. The prevalence of myopia, hyperopia and astigmatism over age groups is shown in Table 4. There was no statistically significant difference in the prevalence evolution over these age groups in neither of the studied refractive pathologies.

TABLE 4. Age groups distribution of refractive errors

Age	No pupils	%	Myopia cases	%	Hyperopia cases	%	Astigmatism cases	%
6	23	4.52	2	11.76	3	6.98	5	7.14
7	111	21.81	3	17.65	7	16.28	13	18.57
8	87	17.09	4	23.53	11	25.58	17	24.29
9	99	19.45	4	23.53	8	18.6	9	12.86
10	109	21.41	2	11.76	6	13.95	11	15.71
11	80	15.72	2	11.76	8	18.6	15	21.43
Total	509	100	17	100	43	100	70	100

DISCUSSIONS

In a study on rural India schoolchildren, Dandona R. (13) reported the prevalence of myopia ($-0.50SD$) of 4.1% (similar to our study 5.06%), of hyperopia ($+2.0SD$) 0.78%

and of astigmatism ($0.75CD$) of 2.8%. There are many papers on childhood refractive error in the literature, reporting a broad, worldwide variation in the prevalence of myopia and

hyperopia. Substantial differences in methods, definitions, and demographics, however, preclude meaningful detailed comparisons with our data.(1)

In 2003, Budau M. and collaborators conducted a screening of refractive errors of children investigated at "Luis Turcanu" Hospital's Ambulatory. They concluded that out of the 646 children, 407--63% (CI95 = 59.1-66.7) had refraction errors, out of which 1.5% (CI95 = 0.8-2.9) were myopic, whereas 49.8% (CI95 = 45.9-53.8) were hyperopic. Astigmatism was found in 11.8% (CI95 = 9.4-14.6), and the mean age was 10.7 years (4). Compared to their study we found higher prevalence of myopia (5.06% in our study and 1.5% in the cited study [$p < 0.0001$]). Differences in prevalence are found in astigmatism cases, which we found to be most frequent, while in the above mentioned study hyperopia had the highest prevalence. We believe the differences arise from the different definitions of the studied pathology. Our target group is from rural environment only. In the cited study there was no differentiation between the two environments in which regards the target group. Patients who went to "Luis Turcanu" Hospital's Ambulatory already had some symptoms and possibly a current disease. This could be a good explanation for the high percentage of refractive errors found

(63%). Their target group doesn't have a classification of the child's developing environment. Our study group is form exclusively of schoolchildren aged 6 to 11 from rural areas of Arad County. In a study, Bucsa D. and collaborators concluded that the most common disorders in preschool- and schoolchildren are refractive errors. (5) We found that 74.46% of children from the study were emmetropic and 25.54% ametropic. This could mean that about one quarter of elementary schoolchildren have refractive errors.

In 2001, Hendrickson K, Bleything W. conducted a screening of Romanian children and adults. They found the following data : 45% of the children were emmetropic, 27% were myopic, and 28% were hyperopic. 42% of the adults were emmetropic, 16% were myopic, and 42% were hyperopic. When compared with other nations, the prevalence of myopia was higher in the Romanian children, whereas in adults the hyperopia was higher. With-the-rule astigmatism had the highest occurrence when compared to other axis orientations, yet the overall occurrence of astigmatism was less than that found in other nations for both children and adults. Incidence of astigmatism was lower compared to other nations in both children and adults. The prevalence of strabismus and other ocular diseases was lower in the Romanian children as compared to other nations. (3)

CONCLUSIONS

The most prevalent ophthalmic pathology in Arad rural schoolchildren is astigmatism, followed by hyperopia and myopia. Astigmatism is more prevalent in girls and hyperopia is more prevalent in boys. There is no statistically significant difference in the

prevalence of myopia cases in the two sexes.

We didn't find any variation of prevalence between age groups from 6 to 11 in any of the studied refractive pathology.

The most prevalent newly discovered ophthalmic pathology in

rural schoolchildren is astigmatism, followed by hypermetropia and myopia.

Elementary schoolchildren are a high risk group for developing refractive errors. From those astigmatism is the main risk factor of developing amblyopia, followed by hyperopia and myopia.

The most prevalent known and uncorrected (neglected, poor treatment compliance) ophthalmic pathology in rural schoolchildren is astigmatism, followed by hypermetropia and myopia. Basically, no child with astigmatism had any optical correction.

The screening of school and preschool children should be carried out

periodically. Most children are unaware of their refractive errors.

Children aged 6 to 11 and their parents should be educated about signs and symptoms of refractive errors, ocular hygiene and the risk factors involved in the development of these errors, especially amblyopia and other ocular pathological problems.

We believe that the newly discovered refractive errors can be addressed by screenings like this one. It is a good way to discover and treat children ophthalmic pathology and prevent amblyopia. Effective VA screening strategies and cycloplegic refraction measurements are needed to eliminate this easily treatable cause of visual impairment.

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A SURGICAL WORKFLOW MODIFICATION TO IMPLEMENT THE SURGICAL NAVIGATION IN ORTHOGNATHIC SURGERY



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ABSTRACT

The up-to-date "golden standard" in the surgical correction of dento-maxillary anomalies is the Le Fort I osteotomy together with the mandibular sagittal split. We propose a modern way of gaining a better visibility during the osteotomies, by the implementation of surgical navigation, based on POTS (passive optical tracking system). In order to achieve this goal, we had to modify the instruments by adding optical markers, develop a software interface and rendering routine, and also to modify the surgical workflow by adding further steps concerning preoperative CT acquisition, data processing, and creating the premises for surgical tracking in the OR.

Key words: dento-maxillary anomalies, orthognatic surgery, surgical navigation, optical tracking.

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INTRODUCTION

The dento-maxillary anomalies are relatively frequent pathological conditions regarding the development of the dento-alveolar arch and maxillary bones. In severe cases, with major jaw imbalance, a complex treatment is indicated, combining orthodontic and surgical procedures. For bimaxillary anomalies, the "gold standard" associates the maxillary Le Fort osteotomy, and the bilateral sagittal split osteotomy (originally described by Obwegeser and Dal Pontand modified by Epker and Reyneke). This procedure is primarily performed for sagittal anomalies, but it can also

simultaneously correct vertical or transversal anomalies.

A major problem of the surgical intervention is that most key maneuvers are "blind" or "semi-blind". We considered as "blind" any maneuver where the active part of the instrument is completely invisible to the surgeon; in a "semi-blind" maneuver, the active part of the instrument can be visualized, but only after a short interruption, with visually checking the position of the instrument held in place. These key steps are therefore associated with an increased risk of injury to the adjacent structures.

MATERIAL AND METHOD

We developed a prototype that implements the surgical navigation for maxillary Le Fort I / mandibular sagittal split orthognathic procedures. We used a passive optical tracking system, that tracks the realtime position of certain surgical instruments and of the patient and renders them as virtual objects on a computer screen, maintaining the relative spatial geometry. The first step was to virtualize these objects (patient, instruments).

Patient virtualisation

In order to virtualize the anatomical regions of interest, i. e. the bony and dental structures of the lower third of the face, we used preoperative CT-scans. These should be performed in a stable intermaxillary relation, with maintaining the same relation intraoperatively. The resulting DICOM dataset is further processed by the dedicated software developed for the prototype.

Instrument virtualization

We have used a set of surgical instruments to be tracked, in fact the orthognathic osteotomes provided by Stryker/Leibinger:

- Obwegeser chisels, active part 8 mm / 12 mm wide;
- curved pterigoid Sailer chisel, active part 11 mm wide;
- narrow curved pterigoid chisel, active part 6 mm wide;
- Schwenzer nasal chisel (left/right);
- Nasal gouge, bayonette shaped.

We obtained the virtual image of these instruments through LASER-scanning, using the FaroPlatinumArm (FARO Swiss Holding GmbH), providing a scanning resolution of up to 35 µm. The virtual models have been processed using CAD/CAM software: LASER-scan acquiring and primary modelling using Geomagic Qualify 9, followed by virtual 3D prototyping using AutoDesk Inventor Professional 11. The resulting virtual objects have been stored as VTK files, as point matrices.

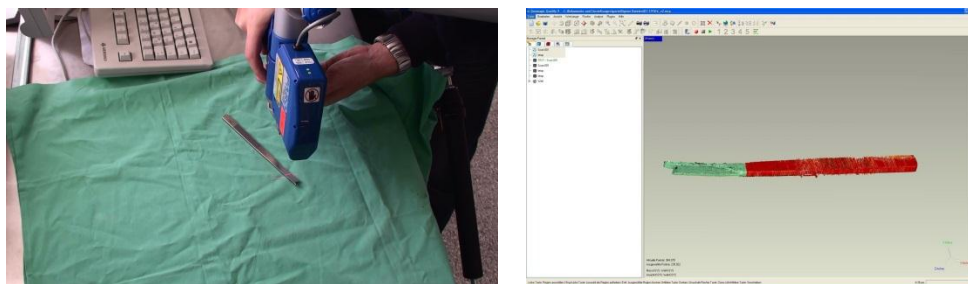


Fig.1. (a, b). LASER scanning of the Schwenzer chisel for the lateral nasal septum (right) using the FaroPlatinumArm scanner and the resulting point cloud representation, after preliminary computing using Geomagic Qualify 9

Setting up the 3D tracking

For our prototype, we have used a passive optical tracking system, the NDI Polaris Spectra (Northern Digital Inc., Waterloo, Canada). Such a system includes the following parts:

- the location module, that provides the 3D location of specific markers through stereophotogrammetric processing, to a global cartesian reference system. The location module emits IR-light that is reflected by the markers mounted on the object (in our case the instruments or the patient). The image of the markers is registered through two CCD cameras and hardware processed, the resulting coordinates being fed through a serial link to the computer;
- the fiducial markers – are in fact highly reflecting spheres that are mounted in a predefined geometry on each tracked object; the marker mounting is called *dynamic reference frame* (DRF) and has to be fixed on each instrument and on the patient, at the upper or lower jaw respectively, depending on the surgical region of interest. We prefer the non-invasive DRF mounting on the patient, which was possible using modified acrylic impression trays or splints; if the fixation is not stable enough, the alternative is to mount the DRF's invasively, using transcutaneous or transmucosal screws;
- the software for processing and realtime rendering of the objects.

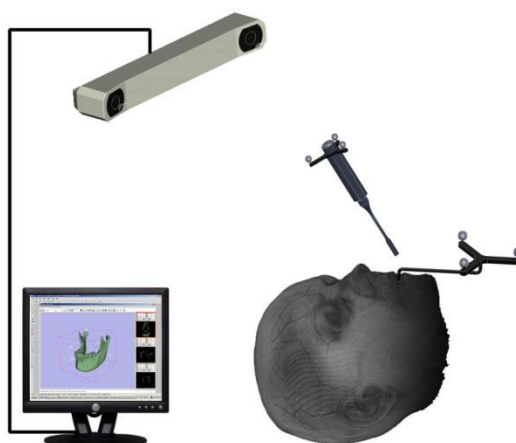


Fig. 2. Schematic representation of the tracking system: the location module, connected to the computer where the realtime rendering software is run; DRF's mounted on the patient and instruments.

As a result of our trials, we propose a workflow modification of the bimaxillary orthognathic surgical procedure (Le Fort I / sagittal split), to implement the surgical navigation system, as further described.

Preoperative CT-Scan of the lower third of the face

The CT scan will be performed with the jaws in occlusion, the scan slices needing to be as parallel as possible with the frontal occlusion plane. The exam will include the lower third of the face; being extended another 10 mm cranially to the anterior nasal spine, in order to acquire anatomical data above the Le Fort I osteotomy line. The minimal requirements for the CT scan are: reduced field of view, adapted to the cephalic extremity (250 mm) and 0,5 mm slice thickness. If possible, an increased scan resolution of 1024x1024 is preferred.

Initialisation of the surgical navigation system, opening the dataset and segmentation of the maxillary and mandibular regions of interest

Intraoperatively, after positioning the patient obtaining the surgical sterile field, the OP assistant will start the OrthoNTK software. The next steps in the software are to connect to the Polaris tracker, open the patient dataset and perform the thresholding and topographic segmentation of the bony structures – supraocclusal (maxillary region of interest) and infraocclusal (mandibular region of interest).

The bone segmentation consists of selecting the rendering constraints for bony structures out of the dataset. It is based on the fact that the cortical radiodensity has typical values between 400 and 1000 HU, while the medullar bone has a typical radiodensity of 142 ± 48 HU. Our tests on multiple datasets showed a

sufficient representation of the medullar bone using a threshold filter ranging between 350 and 2000. Practically, this filter retains all the dataset structures with a radiodensity between 350 and 2000 HU and “deletes” all other elements from the dataset.

The topographic segmentation of the mandible represents in fact segmenting out the mandible from the rest of the viscerocranium, as a primordial element that allows a good visualisation throughout the 3D rendering. We use a relatively simple semiautomatic method of segmentation, that splits the dataset in *.dcm slices above and respectively below the occlusal plane. This method confers an excellent structure visibility for the orthognathic procedure. A condition for the method is to have the CT scan performed with the slices as parallel as possible with the occlusal plane. The typical arch-formed occlusal plane does not allow a perfect separation of the upper and lower teeth, but the approximation is very good for the surgical orthognathic purposes, without complicating the segmentation procedure. Using this method, the maxillary region of interest will include also the superior part of the mandibular ramus (including the TMJ), but the graphical rendering allows a good visualisation of the pterigo-maxillary region. The mandibular foramen will be in nearly all cases part of the infraocclusal segment (of mandibular interest), allowing the needed orientation throughout the sagittal split osteotomy.

The topographic segmentation of the mandibular canal will be separately performed using manual/semiautomatic segmentation, by thorough interactive region growing, using dedicated software (e.g.

3D Slicer). A separate ROI (*region of interest*) representing the mandibular canal will be created and integrated in the rendering.

Mounting the dynamic reference frames and markers on the instruments

The dynamic reference frames (DRF's), also called rigid bodies, will be sterilised and then applied in sterile conditions on the handles of

instruments. The passive tracking markers will be applied on their mounts. These are also sterilisable components that are available from the tracker producer Northern Digital Inc.; they guarantee the rigidity and reproducibility of the marker positioning, so that the marker mounting errors on the DRF are principally negligible.

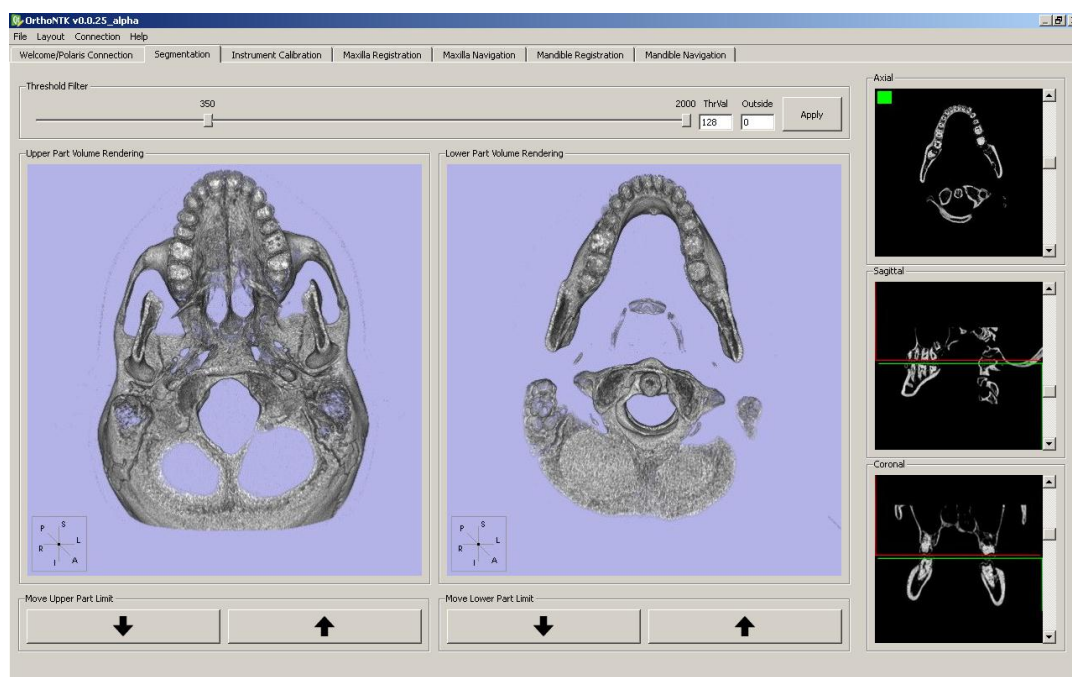


Fig. 3. Thresholding and topographic segmentation of the supraocclusal and infraocclusal regions of interest, using the computer interface.

Instrument calibration

The instrument calibration will be performed in sterile conditions after marker mounting. Each instrument will be introduced into its respective calibration adapter and a "pivotisation" under tracking conditions will be performed. Through the software each instrument to be calibrated is selectable and instructions for the pivotisation are provided. It will be performed through slow, ample rotation movements of the handle, to a fixed point at the adaptor tip.

Mounting the dynamic reference frame on the patient

We recommend a non-invasive DRF mounting on the patient, using modified mini-impression trays restrained to the frontal teeth, and a low elasticity silconic impression material, that insures a good rigid fixation. For a good visibility and surgical access, the DRF will be caudally oriented.

Maxilla registration and marking anatomical landmarks

After DRF mounting, a calibrated tracking pointer will be used to mark certain anatomical points. The same

point will be indicated on the virtual model. The software indicated the registration accuracy.

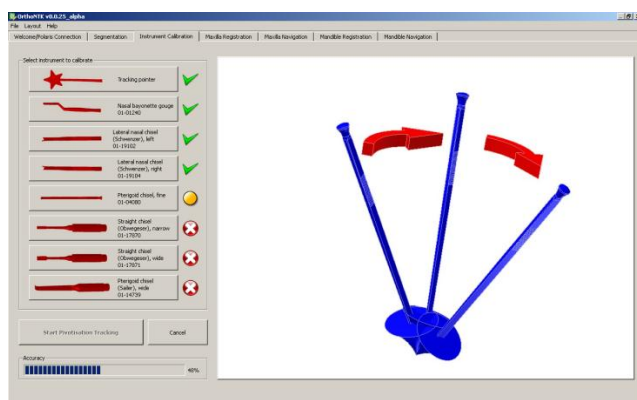


Fig.4. (a, b). Calibration of the de pterygoid osteotome using the pivotisation adapter.

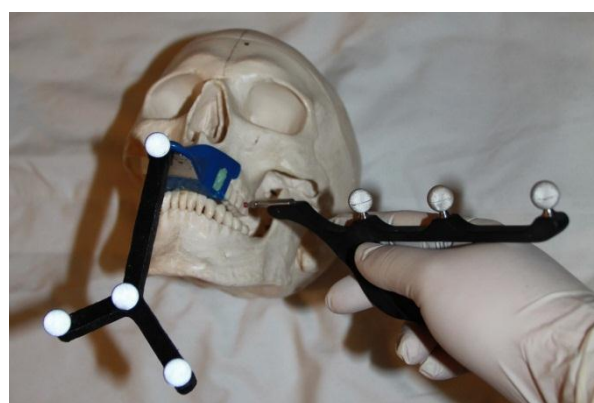
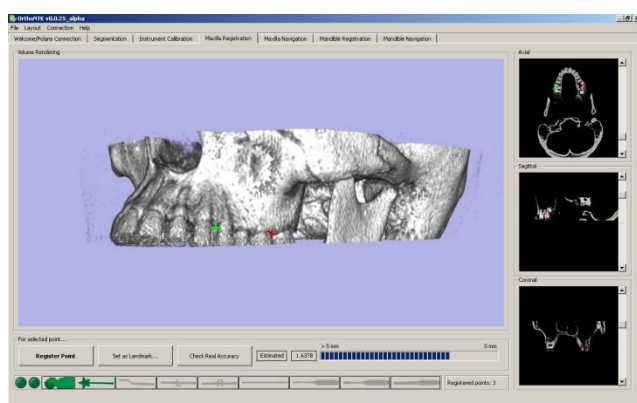


Fig.5. (a, b). Maxilla registration using virtual and patient marking of certain anatomical landmarks – model testing.

We do not constraint the procedure by providing predefined landmarks, in order to avoid incompatibility situations (e.g. through edentations) or difficulties to obtain an unequivocal marking. On the other hand, we recommend the registration of well defined anatomical landmarks, such as the tip of the anterior nasal spine in the superior vestibule, the mesial papilla of the first bicuspid tooth, the distal papilla of the first molar etc. Thus we avoid the landmark registration at the frontal teeth, whilst they are inaccessible because of the frontal mini-impression tray. There are also some virtual landmarks to be selected, such as the interincisive papilla and the the anterior and

posterior nasal spines, in order to define the median line.

Maxillary surgery

In the software interface the maxilla navigation window will be selected. The Le Fort I osteotomy will be as usually performed, using the tracked osteotomes. The surgical steps that will be performed under tracking/navigation using our prototype are:

- splitting of the tuber maxillae from the inferior third of the pterigoid process;
- lateral nasal wall osteotomy;
- nasal septum / vomer osteotomy.

After completing the osteotomies and the maxilla downfracture, the virtual rendering of the bony structures does not reflect the clinical situation anymore, therefore the navigation can be stopped and the maxillary DRF can be removed.

Mandibular surgery

In the same way the DRF is mounted on the mandible, the patient registration is performed and then the usual sagittal split osteotomy can be

done. Our prototype allows the navigated mandibular osteotomy and fragment split, also rendering the anatomical situation between the tooltip and the mandibular canal in the 2D windows.

After the mandibular split, the virtual representation does not reflect the intraoperative situation anymore, therefore the navigation is stopped and the DRF removed. The surgical procedure will be completed as usual.

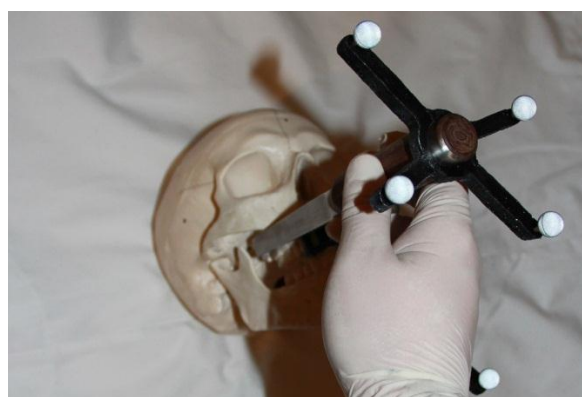
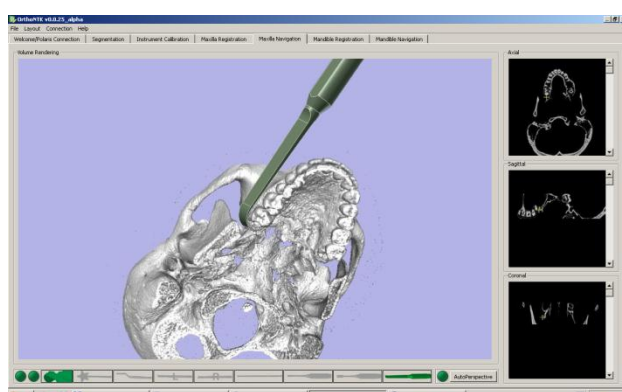


Fig.6. (a, b). Surgical navigation during the pterigoid osteotomy on the right side – model testing.

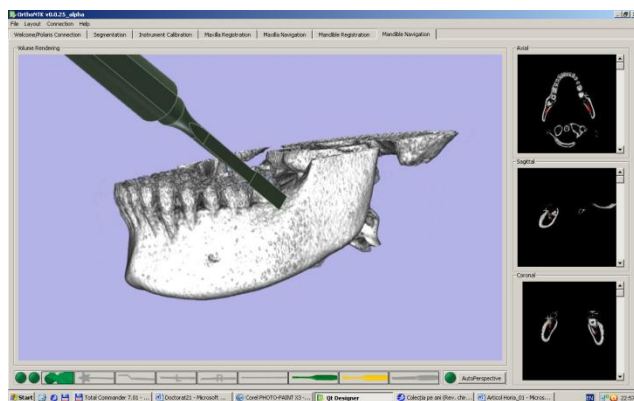


Fig.7. (a, b). Surgical navigation at the beginning of the sagittal split osteotomy – model testing.

RESULTS AND DISCUSSIONS

There are many tracking systems available nowadays. Commercial systems have been already made available, providing universal DRF's that can be adapted and mounted pretty much to any surgical instrument. After calibration, the surgical

navigation is made thus possible, also for oral and maxillofacial procedures.

Unfortunately all these systems provide an insufficient representation for the orthognathic surgery, considering the tridimensional, most variable shape of the osteotomes.

Therefore, a standard navigation system, for example BrainLab, cannot provide the expected results, because:

- Calibrating an orthognathic osteotome is not possible, because the instrument has an active edge, not a point. There is a need for a special calibration adapter, and, more than that, a software modification to be aware of the tridimensional movements of the instrument;
- Most standard navigation systems have proprietary software that does not allow modifications or adapting it to specific needs of the orthognathic surgery, such as the

above mentioned three-dimensional instrument representation and tracking.

Another important aspect is the automated virtual perspective based on the surgical step. This allows the optimisation of the surgical workflow, without the need of recurrent adapting of the computer representations. These were the reasons that led us to develop the OrthoNTK orthognathic surgical navigation prototype, actually an adaptation of the orthognathic instruments and a software development to meet the specific rendering needs.

CONCLUSIONS

The surgical correction of severe dento-maxillary anomalies is nowadays standardized, using well defined surgical steps and instruments.

In the development of our prototype, we used the most recent technological standards in medical imagery and surgical navigation. Our aim was to obtain a better visualisation of the anatomical situation of the osteotome tips, during certain critical “blind” maneuvers in orthognathic surgery (Le Fort I and sagittal split osteotomy).

The system is actually an adaptation of modern optical tracking systems and concepts to the orthognathic instruments and procedure. There are nowadays many commercially available surgical tracking systems that allow a relatively simple adaptation of any surgical instrument to navigation. Still, these systems cannot provide a sufficient virtual representation of the tridimensional osteotomes, and an optimisation to the specific surgical workflow is also not possible.

Therefore, we developed a specific tracking system based on the following modifications to certain instruments and to the surgical workflow:

- a preoperative CT-scan of the lower third of the face will be performed;
- the orthognathic osteotomes provided by Stryker/Leibinger have been modified, by mounting passive optical tracking markers; the patient will be also tracked by non-invasively mounting a set of similar markers;
- the system uses a NDI Polaris optical tracking system;
- the software allows realtime two-dimensional and three-dimensional rendering of the surgical situation (instruments and patient) for blind maneuvers.

At this point we have performed multiple tests in a surgical experimental environment, on anatomical models, with good results and accuracy. Intraoperative testing on real human patients will be performed at a later stage. We consider that the OrthoNTK prototype is one of the first

implementations of the latest surgical navigation technology into the standardized modern orthognathic

surgery, and also in oral and maxillofacial surgery in general.

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GENERAL ANESTHESIA FOR THE PROVISION OF DENTAL REHABILITATION IN A MENTALLY RETARDED PATIENT. CASE REPORT



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ABSTRACT

Aim: the aim of this paper is to present the successful dental treatment at a mentally retarded patient, who otherwise would not obtain the necessary dental care, the need and demand of treatment under general anesthesia (G.A.) and the protocol that has to be followed if treatment is realized under G.A.

Materials and methods: A 26 year old mentally retarded woman, weighing 56kg required dental treatment. The patient has tried to realize dental treatment also in younger ages, and also recently, but dental treatment under traditional circumstances were not possible. The patient was suffering from big dental pain. The treatment was realized under G.A. respecting one minimum protocol that we think has to be respected and has to be known.

Results: The primary result was that one mentally disabled patient could receive dental treatment.

Conclusion: Mentally and physically handicapped patients can, under G.A., have a high standard of care, which might not be possible under local anesthetic as they are often unable to cooperate.

Key words: mentally retarded, dental rehabilitation, G.A.

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INTRODUCTION

Providing dental treatment for patients (adults and children) with uncooperative behavior because of varying degrees of developmental delay continues to be a challenge for the dental profession. Dental care provider under general anesthesia (G.A.) continues to be an important means by which their behavior can be predictably managed ⁽¹⁻²⁾. G.A. for dental care is necessary to facilitate the provision of safe, efficient, and effective quality treatment for the following⁽³⁾:

1. Patients with certain physical, mental or medically compromising conditions.
2. Patients with dental needs for whom local anesthesia is ineffective because of acute infection, anatomic variations or allergy.
3. The extremely uncooperative, fearful, anxious or non-communicative patient with dental needs
4. Patients who have sustained extensive oro facial and dental trauma.
5. Patients with dental needs who otherwise would not obtain the necessary dental care.
6. Protection of the developing psyche of fearful children.

Complete oral rehabilitation is carried out to avoid repetition of the

G.A. procedure, resulting in an extensive dental treatment completed in a short period of time.

Although the administration of a G.A. is relatively safe, complications such as allergic reactions, bronchospasm, nausea with vomiting, fever, sore throat, pharyngitis, lip swelling and delayed or prolonged recovery can occur ⁽⁴⁻⁵⁾. The use of G.A. to manage uncooperative behavior or severe anxiety in dental patients has been determined to be a safe practice, with a very low rate of morbidity and mortality, whether performed in an office or in a hospital setting ⁽⁶⁾. The majority of studies that have focused on delivery of dental care under G.A. have determined this to be a safe method for delivery of the care ⁽⁷⁻⁹⁾.

There are no facilities for dental treatment under G.A. available in the west part of the country, other than the one where the presented patient was treated.

The aim of this paper was to present the successful dental treatment at a mentally retarded patient, who otherwise would not obtain the necessary dental care, the need and demand of treatment under G.A. and the protocol that has to be followed if treatment is realized under G.A.

MATERIAL AND METHOD

A 26 year old mentally retarded woman, weighing 56kg required urgent dental treatment and dental rehabilitation.

The first dental problems appeared during the temporary dentition. Due to the mentally problems the patient suffered, treatment was impossible the be

realized. The only dental maneuver the patient suffered was the extraction of 65, during which the patient was immobilized which accentuated the refusal of the patient to collaborate with the medical staff, of any kind.

The patient has been suitable evaluated prior to the start of any dental procedure.

In the first meeting, the patient was seen in the dental office and send for the following examinations:

1. A focused physical evaluation
2. Review of the medical history
3. Medication used
4. ECG
5. Blood analysis

The second meeting included the Anaesthetist who evaluated the patient as being a medically stable individual, with mild systemic disease, ASA II ⁽¹⁰⁾, compatible of dental treatment under G.A.

For a successful dental treatment under G.A. minimum standards for sedation and general anesthesia must be respected. The preoperative preparations consisted of:

1. The care giver of the patient has been advised regarding the procedure associated with the delivery of any sedative or anesthetic agents and informed consent for the proposed anesthesia has been obtained.

2. The adequate oxygen supply was determined and the equipment necessary to deliver oxygen under positive pressure was double verified.

3. Preoperative instructions were verbally and written given to the person responsible for the patient

For caring out the dental treatment under G.A. the following criteria regarding personnel, equipment, monitoring, documentation, recovery and discharge must be respected:

The personnel and equipment requirements necessary for this intervention are:

Personnel:

1. minimum of three persons need to be present.
2. An aneesthesiologist

3. One assistant trained in anaesthesiology

4. One dental assistant

Equipment:

1. A positive pressure oxygen delivery system suitable for the patient was immediately available

2. The equipment necessary to establish intravenous access

3. Equipment and drugs necessary to provide advanced airway management and advanced cardiac life support

4. Monitor for inspired agent analyses and a capnograph

5. Monitor for following all the vital signs of the patient during the procedure

6. Resuscitation medications and a defibrillator

During the intervention the patient was being monitored following the:

- Ventilation. Because of safety reasons the patient is being intubated, end-tidal CO₂ and the respiratory rate has been continuously monitored and evaluated

- Oxygenation. The oxygen saturation, color of mucosa, skin and blood was continually evaluated.

- Circulation. The heart rate and rhythm, the pulse rate and the blood pressure were monitored throughout the entire procedure

- Temperature.

For realizing of this documentation Siemens sc7000 has been used.

The documentation for dental treatment consists of:

- Time-orientated anesthetic record, including the names and doses of all drugs administered, including local anesthesia

- The recordings of all the vital signs (heart rate, respiratory rate and blood pressure and temperature) during the whole intervention

- The dental procedures carried out.

Only after the criteria can be respected dental treatment under G.A. can be carried out.

In the third meeting the dental treatment under G.A. was accomplished. The patient was brought to the dental clinic at 8:30. The assistant brought the patient in the recovery room, where it was changed in appropriate clothes, special for the intervention. The care giver was always with the patient.

Prior to the intervention, there was one more discussion with the care giver to make sure the preoperative instructions were followed. The anaesthesiologist consulted also the patient.

The patient was brought to the dental office accompanied by the assistant and it's care giver, and was put on the dental chair. After a short while, approx. 3 minutes, when the patient started to be less nervous, the care giver was leaving the dental office.

The anaesthesiologist induced the G.A. In the first session the anaesthesiologist faced difficulties, because the patient refused the inhalation mask with sevofluarane. She even started to become nervous and aggressive. The patient was calmed down. Due to it's mental affections conversation was almost impossible. The patient accepted the application of one i.v. flexule inserted. During the other sessions the patient was calmer, more relaxed and more confident and accepted the mask and any instructions from the medical staff.

For the G.A. following substances were used:

For the initiation of the anaesthesia:

- Oxygen
- Sevofluorane
- 20mg Fenatnyl

- 3mg Dormicum
- For maintaining the G. A.:

- Oxygen
- Sevofluorane
- 100ml Glucoze

During the wakening phase:

- 250mg Perfalgam
- 30mg HHC



The dental procedures carried out have been:

In the first session extractions of 15, 12, 11, 22, 24, 25, 35, 36, 45 and 46 have been realized.

In the second session, which has been carried out after one month, when the tissue was healed, the following maneuvers have been made: pulpectomy with rooth canal filling for 14, 16, 21, 23, 26, 34, 37, 44, 47 and bont preparation.

The anaesthesiologist and the qualified assistant have remained in the

operatory room, and have monitored the patient during the whole interventions, until it has reached the criteria of recovery.

At the end of each treatment the patient was brought to the recovery room and was monitored by the qualified assistant.

The criteria regarding the recovery and discharge that must be respected, and was exactly followed, is:

- There is one special recovery room where oxygen and suction equipment is immediately available
- The patient's blood pressure, heart rate, oxygenation and level of consciousness have been continually be monitored by the clinical staff
- Before the patient could be discharged, the level of consciousness has been determined and the

oxygenation, ventilation and the circulation have been satisfactory for discharge.

- The care giver was given post-operative, verbal and written, instructions (Table 2)

- The clinical staff did not leave and must not leave the facility until the patient meets the criteria for discharge and is discharged from the facility.

At the end of each intervention the patient left the dental clinic, accompanied by it's care giver.

With each dental intervention the patient become more confident and less scared. The patient followed more and more easy every instructions.

The last sessions were realized under sedation with sevoran, the masc that the patient violently refused in the first intervention showing the confidence the patient has reached.

RESULTS

The primary result was that one mentally disabled patient could receive dental treatment.

The patient was under accurate monitoring during the whole intervention, and did not feel any discomfort. At the check up meeting,

the patient was smiling and entered the dental office without any fear, proving that the use of different techniques and drugs for the management of dental pain, fear, anxiety and for mentally affected persons have a huge emotionally impact ^(11 12).

CONCLUSIONS

Mentally and physically handicapped patients can, under G.A., have a high standard of care, which might not be possible under local anesthetic as they are often unable to cooperate ⁽¹³⁾.

Also previous studies reported a lower quality of dental care for this group of patients in regular clinical settings ^(14 15).

This paper supports the position that mentally challenged patients (and also the ones being very anxious) can receive their required dental treatment in a safe and predictable manner under general anesthesia in a day-surgery facility, and that such facilities should be maintained to meet the demands for dental care for this select group of individuals.

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USING BARRIER MEMBRANES IN GUIDED TISSUE REGENERATION (GTR)



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ABSTRACT

The rational of guided tissue regeneration (GTR) is to stop apical migration of the epithelium and conjunctive tissue by placing a barrier membrane on the root surface, permitting the selective induction of periodontal derived cells, assuring favorable conditions for its regeneration. A very important moment in GTR represents choosing the type of membrane. Sometimes the choice is difficult, because each type presents advantages and disadvantages and only a careful evaluation according to the clinical situation can lead to the desired results. Application of GTR methods are commonly joined by the appearance of gingival retraction. In case of using not resorbable membranes, the newly formed tissue can be covered by coronary sliding of the gingival tissue after removing the membrane. This is not possible when using resorbable membranes. For this reason, these membranes are not indicated in deep bone defects and teeth with high esthetic value. Regardless of the type of chosen membrane they have to be perfectly adapted to the bone defect. Using barrier membranes with the GTR technique has shown great progress in periodontal tissue regeneration. Clinical studies have shown a stability of the obtained results, 3-4 years post-operative, when GTR and addition material has been used.

Key words: gingival retraction, barrier membrane, deep bone defects.

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INTRODUCTION

The objective of complex marginal chronic periodontitis treatment is not only to control periodontal disease, but also to regenerate the periodontal tissues,

NYMAN's studies set the bases of the guided tissue regeneration concept. NYMAN covered the root surface and bone defects with a Milipore filter, having the role of separating the conjunctive and epithelial tissue from the root surface. Histological results showed cement and collagen fiber formation underneath the membrane.

Therefore, the rationale of guided tissue regeneration (GTR) is to stop apical migration of the epithelium and conjunctive tissue by placing a barrier membrane on the root surface in order to avoid the contact between gingival tissue and root surface, permitting the selective

induction of periodontal derived cells, assuring favorable conditions for its regeneration. [7]

In order to fulfill the role of a barrier for bacteria as well as for the elimination of the bone substitute, the membrane has to have the following characteristics:

1. The dimension of the pores has to be under 0.2 microns allowing the proteic component to pass.

2. The resorption has to start after 6-8 weeks from application allowing the regeneration of bone defects. [3]

A very important moment in GTR represents choosing the type of membrane. Sometimes the choice is difficult, because each type presents advantages and disadvantages and only a careful evaluation according to the clinical situation can lead to the desired results.

MATERIAL AND METHOD

During the last years, unresorbable membranes have been used more rarely because they had to be removed 4-6 weeks after implantation. [4] Therefore a second intervention is needed and sometimes one can conclude that the immature tissue is stuck to the membrane. Trying to remove the membrane, it is possible to deteriorate the newly formed tissue and affect the regeneration process. After removing the membrane, there appears a new problem, the need of full covering of the bone defects. If the newly formed tissue can't be covered during the second surgical intervention, the quantity of regenerated tissue will be smaller. Resorbable membranes don't necessitate a second surgical intervention, this

advantage offering the patient a bigger comfort.

A major disadvantage of resorbable membranes is that they can't be removed in case of premature exposure [9]. Exposure of the membrane is frequently seen. This doesn't mean the failure of treatment but it increases the risk of bacterial infection within the newly formed tissue. In cases of membrane exposure and signs of bacterial infection, the membrane can be removed and the newly formed tissue evaluated. This is why Becker recommends using resorbable membranes only in cases of minimal gingival retraction, when the connective tissue has a thickness of 1.5-2 mm and enough vascular resources and keratinized mucosa, realizing a

complete closing of the defect. [2] Therefore, the complete closure of the defect is unsure, existing tension areas, a not resorbable membrane is preferred.

Application of GTR methods are commonly joined by the appearance of gingival retraction. In case of using not resorbable membranes, the newly formed tissue can be covered by coronary sliding of the gingival tissue after removing the membrane, resolving the gingival retraction. This is not possible when using resorbable membranes. For this reason, these membranes are not indicated in deep bone defects and teeth with high fisionomic value. As well, in cases of smoking patients, the use of not resorbable membranes are indicated.

Post-operative control of the patient is essential in these cases. Acest lucru nu este însă posibil în cazul folosirii membranelor resorbabile [6].

Regardless of the type of choosen membrane (resorbable or not resorbable), they have to be perfectly adapted to the bone defect.

The adequate size has to be choosen, and the membrane has to be adjusted and to fully cover the defect, having a 2-3 mm lateral and appical extension. The membrane has to have the smallest possible dimension, because overcovering the defect can lead to the interfearence of vascular resources and a decrease of it's vascularization. Also, the margins of the membrane have to be round, to avoid the perforation. [1]

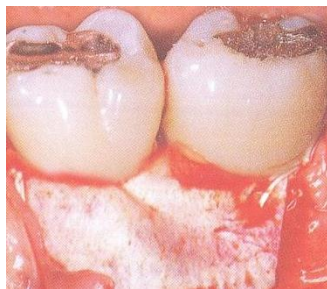


Fig.1



Fig.2

Fig.1 and Fig.2 application of the barrier membrane over the bone addistion area, with a lateral extension over the healthy bone of 2-3 mm. [9] .

RESULTS AND DISCUSSIONS

The research showed that the regenerated periodontal tissue has been directly influenced by the membrane's position.

If the membrane is placed coronally, more space for regeneration is obtained, thus, the quantity of newly formed bone is higher. The worst results have been obtained when the membrane collapsed inside the defect. Thus, it is necessary to sustain the shape of the membrane during

periodontal healing, through the shape of the addition material or by using titanim insertions fixed in the bone. [5]

Repositioning the connective tissue has to be realised as to obtain full coverage of the membrane by a thick layer of tissue, having sufficient vascular resourcesto avoid the membrane's exposure. Achieving primary closure, without tension, is elementary in order to obtain optimal healing. [10]

Using barrier membranes with the GTR technique has shown great progress in periodontal tissue regeneration. The success is eloquent in cases of vertical, deep and narrow bone defects, surrounded by bone walls (periodontal pouches limited by three walls). In these cases, a certain regeneration can be obtained through classical surgery but the final results are significantly inferior to those obtained through GTR.

For bone defects that don't respect these conditions, it has been

proven that favourable results can be expected only if there is space underneath the membrane, this means, if the defect is surrounded by one or two bone walls. In these cases the results are nevertheless limited.

Clinical studies have shown a stability of the obtained results, 3-4 years post-operatory, when GTR and addition material has been used. The success is due to the fact that bone grafts facilitate the formation of space and the maintaining the membrane in its original position.

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RADIOLOGICAL INVESTIGATIONS IN PEDODONTICS



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ABSTRACT

The Pedodontics became, in the last period, an independent specialty due to the will to ameliorate the dentistry treatment given to the children. But both the conceptions and techniques used in pedodontics are different than those used for adults.

The most frequently used X-rays in pedodontics are: the dental retroalveolar X-ray, based on a film of 2/3 cm, the bite-wings, the ortopantomographies and the digital X-ray. The most important advantage for children of digital radiographies is that the irradiation is decreased with ~ 80%, the children being in the process of growing and development.

Key words : radiography, child, pedodontics, radioviziography, irradiation.

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INTRODUCTION

The Pedodontics became, in the last period, an independent specialty due to the will to ameliorate the dentistry treatment given to the children. But both the conceptions and techniques used in pedodontics are different than those used for adults.

OBJECTIVES: The present work is proposing as objectives the identification, from many radiological investigations, which are used in the present, the most used radiological methods in pedodontics, wishing to develop the dentistry treatments for children.

MATERIAL AND METHOD

We will use all the dental X-ray which exist in the data base of 500 children, patients in a dentistry office from Oradea. (1,2).

Thus, we will analyze (3):

- the dental retroalveolar X-ray, based on a film of 3/4 cm

- the dental retroalveolar X-ray, based on a film of 2/3 cm
- the bite-wing
- the ortopantomographies
- the digital radiographies.

RESULTS AND DISCUSSIONS

There is no other innovation that contributed more to the development of the dentistry as the X-rays, discovered by Wilhelm Konrad Roentgen, in November 1895. In 1919 was created the first machine that used a dental X-ray. The methods of making the X-ray that use a conventional film did not suffer radical changes until the present. (4,5,6,7,8).

The retroalveolar, isometric and orthoradial incidence is the oldest radiological incidence, but also the most used, even in the present. It is considered as being the incidence capable to supply the most numerous and complete data about the teeth, the alveolar peaks and the near radiological formations. Based on the principle of the isometry and orthoradiality, it offers an image almost with the same dimensions with the real one. The main deficiency is that of being compartmented, being

sometimes necessary a addition with other x-rays.

The particularity for children is that it is perform on X-rays not of 3/4cm, but of 2/3 cm due to the fact that the children accept it easier.

The bite-wing radiography is one of the most recommended for children who have many decays either in the frontal area or in the side areas. The wing is not covered with radio sensitive emulsion, it has only the mechanical role, of intra oral sustaining of the x-ray. On the x-ray you can see the antagonist teeth and a part of the related parodont, namely the crowns, the parcel, the coronary half of the root, the oclusal half of the alveolar septum belonging to both arcades, on the same x-rays, in the same exposure.

The bite-wing radiography is indicated for children because it accentuates the proximal cavities,

especially for children with multiple cavities, in the front area and in the lateral areas.

In the field of dentistry radio diagnosis a qualitative step was accomplished by the perfecting brought to the panoramic imagery. In the present, is used frequently the orthopantomography (OPT). Following the research made in the last decade, it was introduced the panoramic technique, with the help of which we can visualize on a single x-ray the upper maxilar and the inferior, too. It is characterized from the technical point of view by simplicity.

The orthopantomography is, by the technique of performance, a tomography, being ortho-radial and including almost the entire facial mass. It is based on the principle of the circulation of a fascicle of radiations with the form of slot, in order to include both arcades, by a continuous covering from one extremity to the

other. The image obtained is very ample allowing for the simultaneous visualization of the two alveo-dental arcades. It is important in establishing the diagnosis in pediatric dentistry. The orthopantomography offers the possibility of inclusion in the same x-ray of the image of the entire dentition, respectively an overview of both arcades, this being the greatest advantage of this type of radiography. The orthopantomography is one of the most frequently used in pediatric dentistry, having a great value of diagnosis for the child patient. But, it is sometimes difficult to be performed, especially for little children due to the continuous exposure. The difficulties of interpretation appear in the case of the dental crowding (9, 10). And also a disadvantage, due to the continuous exposure, the clarity of the image has to suffer, and the incisive region is masked, in part, by the overlapping with the spinal column.



Fig. 1: Retroalveolar x-ray fo the incisive-canine area. You can see the germ of the replacement tooth.

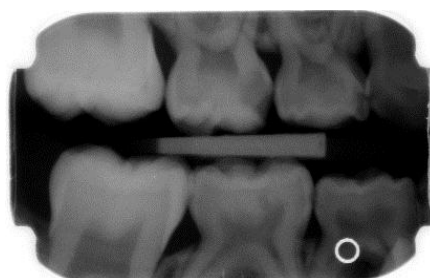


Fig. no. 2: The bite-wing radiography of the right lateral area. You can see a distal cavity at 5.3, mesial cavity at 5.4 and mesial cavity at 5.5.

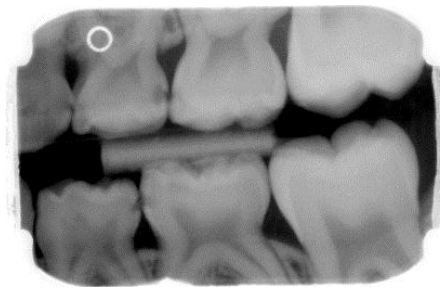


Fig. no. 3: The bite-wing radiography of the left lateral area. You can see a distal cavity at 6.3, mesial cavity and distal cavity at 6.4, mesial cavity at 6.5, distal cavity at 7.4 and mesial cavity at 7.5.

As in the photographic art it was made the transition from the photography on film and paper to the digital one and the processing on the computer the dentistry radiology made the transition from the conventional film to the digital radiography. The digital radiography represents a new frontier in the oral and cheekbone-facial radiology. The dental radiological film is replaced with a photoelectrical

sensor. The first digital intra oral radiography was made with a radiovisiograph (RVG). The image obtained has a superior quality, in regard with the contrast and resolution. The most important advantage for children it that the

irradiation is decreased with ~ 80%, the children being in the process of growing and development.

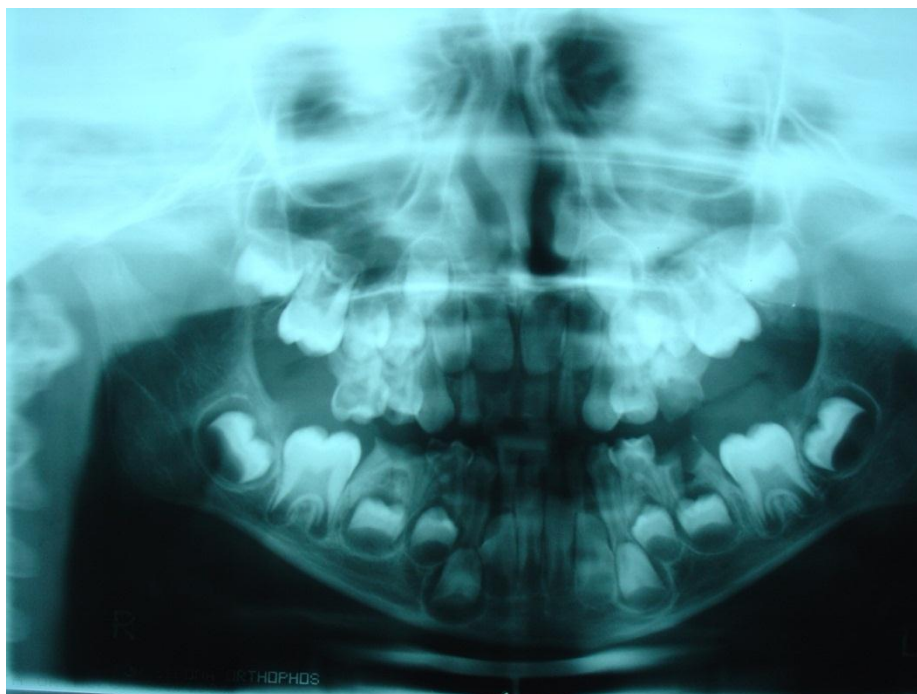


Fig. no. 4: Orthopantomography for a child in the period of mixed dentition



Fig. nr. 5: Digital retroalveolar radiography in a case with diastema.



Fig. nr. 6: Digital retroalveolar radiography for the canine area. It can be seen the temporary canine with the riza almost complete and the germ of the replacing tooth .



Fig. nr. 7: Digital retroalveolar radiography of the left inferior temporary molars. It can be observed a massive cavity at 7.4, mesio-oclusional filling, incorrect, at 7.5 and the germs of 3.4 and 3.5.



Fig. nr. 8: Digital retroalveolar radiography of the left inferior temporary molars. It can be observed 7.4 with complete absorption, cavity injuries at 7.4 and 7.5, the germ of 3.4 and the lack of the germ of 3.5.

CONCLUSIONS

The most frequently used X-rays in pedodontics are:

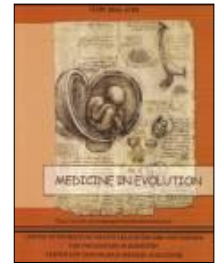
- the dental retroalveolar X-ray, based on a film of 2/3 cm

- the bite-wing
- the OPT
- the digital X-ray

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MALIGNANT TUMORS OF THE JAWS DETECTED AFTER EXTRACTION OF TEETH



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ABSTRACT

Malignant tumors of the maxillary bones deform cortical bone (most commonly on the buccal aspect), invades the periosteum and adjacent mucosa, finally becoming evident in the oral cavity. If the tumor has not been externalized in the soft parts, and tooth in tumor extraction is performed, due to dental pain or mobility, the socket will contain a rapidly growing friable tumor which bleeds easily.

A study was performed of 10 malignant tumors of the jaws that were diagnosed after teeth extraction.

Keywords: malignant tumors, extraction, biopsy

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INTRODUCTION

Most of malignant tumors of the jaws arise peripherally and in rare instances they may arise within the maxillary bones 1.

The development of malignant tumors in proximity of teeth causes gingival swelling associated with pain and loosening exfoliation of the teeth 2. The involved teeth may erroneously be extracted because of suspected periodontitis 3.

Although the danger of extraction of teeth involved in malignant tumors of the jaws has been emphasized, their effects on prognosis of patients have not been evaluated in romanian literature.

I performed a study of a case series of malignant tumors of the jaws that were confirmed after extraction of related teeth, while the initial diagnosis was wrong.

MATERIAL AND METHOD

My study cohort consisted of 10 consecutive patients who were referred for diagnosis and treatment to Oro-Maxillo-Facial Surgery Clinic of U.M.F. „Carol Davila” Bucharest, between 2001 and 2012.

All ten patients followed teeth extractions during the past two years.

There were 9 men and one woman , with ages ranged from 56 to 82 years.

In all patients, histological examination of tissue taken from the

extraction sites confirmed diagnosis of oral squamous cell carcinoma. The study was based on the following data from the patient's records: initial main complaint, initial diagnosis and treatment by referring dentists, clinical and radiographic features, diagnosis at the examination, biopsy results.

The clinical stage at presentation was established according to the TNM classification of malignant tumours as proposed by International Union Against Cancer (UICC) 4.

RESULTS

Local swelling and pain were initially noted by the referring doctors patients in 8 patients. One patient complained of numbness of the lower lip. The initial diagnosis by the referring dentists had been marginal chronic periodontitis in seven patients.

One case was clinical diagnoses as radicular cyst. The diagnosis was unknown in two patients.

Mandible was the site of involvement in nine patients. One patients had a lesion in the upper jaw.

Xrays before teeth extractions were available in three patients. In two

cases, a diffuse resorption of the alveolar bone surrounding the involved teeth (Figure 1) and in one patient no radiographic signs could be observed.

The involved teeth had been extracted in all patients.

The patients were referred at the suggestion of their dentists 10 to 27 days after the extractions.

Tumor of the jaw was suspected in six patients by the referring dentists. Incomplete healing of the extraction sockets was principal diagnosis in two other patients.

The most frequent presenting symptoms of 10 patients who were referred to Oro Maxillo-Facial Surgery

Clinic were ulceration (Figure 2) and tumorous growth (Figure 3) suggestive of malignant tumor (Table 1).



Fig.1 Panoramic radiography shows diffuse resorption of right upper jaw (Photo courtesy of Prof. Dr. Alexandru Bucur)



Fig.2 Oral aspect twelve days after extraction of 4.8. (Photo courtesy of Prof. Dr. Alexandru Bucur)



Fig.2 Ulcerative extraction wound, 27 days after extraction of 4.6. and 4.7. (Photo courtesy of Prof. Dr. Alexandru Bucur)

	N	%
Ulcerative extraction wound	6	60
Granulomatous tissue	3	30
Swelling	1	10

Table 1 Clinical features at the initial examination at OMFS Clinic

Histologic examination of biopsied specimens showed the lesions to be squamous cell carcinoma in nine patients and undifferentiated carcinoma in one patient.

The TNM classification is presented in Table 2. Distant metastasis was not confirmed in any patient.

	N ₀	N ₁	N ₂	N ₃
T ₁	-	-	-	-
T ₂	-	4	1	-
T ₃	-	-	-	-
T ₄	1	2	2	-

Table 2 TNM classification

DISCUSSIONS

The relationship between surgical trauma and metastasis has been a matter of dispute 5.

Surgical extraction without awareness of malignant tumour of the jaw may cause delay in establishing a correct diagnosis and adequate treatment 6,7,8.

The time interval between teeth extraction and histologic diagnosis was between 42 and 67 days. The delay was

due to false diagnoses by referring dentists. This delay may also be one of the factors that facilitated tumor dissemination metastasis, that may have negative influence on the prognosis of the patients. The present study shows that the awareness among dentists that poorly healing extraction sites should be associated with malignant tumors unless proven otherwise, is not largely spread.

CONCLUSIONS

Tooth extraction may cause rapid growth and metastasis to cervical lymph nodes. The incidence of positive lymph nodes is significantly

higher when teeth extraction was performed. Once extracted, prompt establishment of diagnosis and oro-maxillo-facial referral are mandatory.

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TWO COMMON MEDICAL CONTRAINDICATIONS FOR IMPLANT SURGERY



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ABSTRACT

Dentists are confronted with an increasing number of medically compromised patients who require implant surgery for prosthetic rehabilitation. Many systemic conditions have been listed as absolute contraindications for implant therapy. The aim of the present review is to offer scientifically based data for implant therapy in two major systemic conditions.

Potential implications of these diseases for implant-supported rehabilitation success are critically appraised.

Keywords: biopsy implants, systemic diseases, diabetes, antithrombotic therapy

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COMPLICATED DIABETES MELLITUS

Diabetes is currently classified as a relative contraindication for implant treatment. Compared with the general population, a higher failure rate has been seen in diabetic patients with adequate metabolic control 1.

Type 1 diabetes mellitus is an auto-immune disease affecting the beta cells in the pancreas that produce insulin. Type 2 diabetes mellitus is a multi-factorial disease resulting from environmental effects on genetically predisposed individuals.

Prolonged and elevated levels of glucose in the blood, which is left unchecked and untreated, will, over time, result in serious diabetic complications in those susceptible and sometimes even death. There is currently no way of testing for susceptibility to complications 2.

The effect of glycemic level on osseointegration in patients with diabetes remains poorly understood. However, elevated glucose levels inhibit osteoblastic differentiation and produces a deleterious effect on the bone matrix and its components 3.

Type 1 diabetes produces a reduction in bone mineral density through mechanisms that has been attributed to both a lower formation of bone and also to a greater rate of bone loss. This alteration has not been demonstrated in patients with type 2 diabetes.

The main complications of diabetes are related to the and micro and macro angiopathia, that may predispose the patient to tissue degeneration compromised healing with increased risk of infection.

Many of the long-term complications of diabetes, especially the microvascular complications, result from many years of elevated levels of glucose in the blood 4.

Most implant failures occur during the first year of functional loading might. That suggests the microvascular involvement could be the main factor implicated in implant failures in diabetic patients. The microvascularization alteration associated with diabetes leads to a diminished immune response and a reduction in bone remodelling processes.

Poor glycemic control refers to persistently elevated blood glucose and glycosylated hemoglobin levels, which may range from 200–400 mg/dl and 8–15% or higher over months and years before severe complications occur.

Patients with glycated hemoglobin (HbA1c) levels $\geq 8\%$ have a greater maximum decrease in implant stability from baseline and required a longer time for healing (Figure 1).



Fig.1 Implant failure in diabetic patient
(Photo courtesy of Prof. Dr. Alexandru Bucur)

The repercussions on the healing of soft tissue depend on the degree of glycaemic control in the peri-operative period and the existence of chronic vascular complications. The microangiopathy may compromise the vascularization of the flap, thus delaying healing and acting as a gateway for the infection of soft tissue.

PATIENTS ON ANTITHROMBOTIC THERAPY

Antithrombotic agents include anticoagulants (acenocumarolum, heparin and low molecular weight heparin) and antiplatelet agents (aspirin, clopidogrel, ticlopidine and glycoprotein IIb/IIIa receptor inhibitors).

Antiplatelet drugs are used to treat and prevent a wide range of cardiovascular pathologies (atrial fibrillation, acute coronary syndrome, deep venous thrombosis, endoprostheses), hypercoagulable states and cerebrovascular strokes.

The optimal anticoagulant management of such patients during implant surgical procedures has been debated for a long time. Before performing implant surgery procedures on patients taking antithrombotic medications, one should consider the risks of 5:

- a. bleeding related to antithrombotic agents
- b. bleeding related to surgery
- c. thromboembolic event related to interruption of antithrombotic therapy.

Patients with prosthetic heart valves are maintained on lifelong oral anticoagulant therapy. Any planned surgical procedure must take into consideration the anti-coagulant imbalance and infection risk, which may, in extreme cases, lead to acute bacterial endocarditis, responsible for the loss of the valvular prosthesis. It is essential not to plan implant surgery until the patient's stable condition is reached, usually one year after heart surgery 6.

The combination of minimally invasive flapless dental implant surgery without interrupting the normal dose of the anticoagulant medications could be an improved method to place dental implants in

patients on long term anticoagulant therapy. Patients on antiplatelet therapy undergoing cardiac surgery and those with drug-eluting stents require particularly careful management. Antiplatelet agents reduce the risk of ischaemic events but increase the risk of bleeding.

Deciding whether to discontinue antiplatelet agents is a matter of weighing the risk of bleeding against the risk of ischaemic events. The patient's inherent risk for bleeding, concomitant treatments that may increase this risk, the potential of the procedure to cause bleeding, and the patient's risk for ischaemic events if antiplatelet therapy is stopped all must be considered (Figure 2).



Fig.2 Patient on antoplatelet therapy (Photo courtesy of Prof. Dr. Alexandru Bucur)

In general, discontinuation of antiplatelet therapy is considered unnecessary in procedures that are not highly invasive 7,8. As a practical matter, the dentist, cardiologist, haematologist, and neurologist should consult on each case regarding the risk of peri-operative bleeding if antiplatelet therapy is continued and the risk of ischaemic events if therapy is discontinued.

RESULTS

There is a higher risk of failure in diabetic patients and it is necessary to extend the number of prospective studies in order to clarify the true impact of diabetes on the prognosis for osseointegration. Strong recommendations regarding the

management in the perisurgical period cannot be made at this time and dentists are encouraged to seek the input of relevant consultants before discontinuing any antithrombotic agent.

DISCUSSIONS

The relationship between surgical trauma and metastasis has been a matter of dispute 5. Surgical extraction without awareness of malignant tumour of the jaw may cause delay in establishing a correct diagnosis and adequate treatment 6,7,8. The time interval between teeth extraction and histologic diagnosis was between 42 and 67 days. The delay was due to false diagnoses by referring

dentists. This delay may also be one of the factors that facilitated tumor dissemination metastasis, that may have negative influence on the prognosis of the patients. The present study shows that the awareness among dentists that poorly healing extraction sites should be associated with malignant tumors unless proven otherwise, is not largely spread.

CONCLUSIONS

Tooth extraction may cause rapid growth and metastasis to cervical lymph nodes. The incidence of positive lymph nodes is significantly

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LOWER THIRD MOLAR ODONTECTOMY ASSOCIATED COMPLICATIONS



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ABSTRACT

Although transitory, complications after the removal of wisdom teeth can be a source of anxiety for the patient. Early recognition and appropriate management of complications as they arise hopefully will minimize permanent and disabling consequences.

Keywords: wisdom tooth, postoperative complications, surgery difficulty.

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INTRODUCTION

Lower third molar surgery is one of the most common procedure performed by oro-maxillo-facial surgeons. Long-term experience have improved the understanding of the origin and treatment of complications related to wisdom tooth surgery¹.

Early recognition and appropriate management of complications as they

arise hopefully will minimize severe consequences².

A thorough understanding of the complications associated with this procedure will enable specialists to manage complications and to perform the most effective methods of management.

MATERIALS AND METHODS

A number of 43 patients in the age group 17-24 years were treated with bilateral odontectomies of the lower third molars, between march 2009 and march 2012. The group consisted of 25 female and 18 male patients. The treatment was performed in local anesthesia and both molars were extracted simultaneously.

Postoperatively, the patients were controlled on the 2nd and the 7th postoperative days. The sutures were removed on the 7th day postoperatively.

The following records were taken in each case: duration of surgery, swelling, mouth opening, use of analgesics, postoperative abscess.

RESULTS

The mean duration of the surgery varied with the age of the patients. The mean duration in the age group 17-20 years was 21 min; in the age group 21-24 years, the mean operating time was 36 min. The swelling showed 8% increase on the 2nd postoperative day (Table 1). The average range of mouth opening was reduced to 62% of normal on the second postoperative day. On the 7th

postoperative day, the average range of mouth opening had returned to 91% of normal (Table 1).

Average consumption of Ibuprofen tablets of 200 mg was 2.5 tablet in the age group 17-20 years, and 3 tablets in the age group 21-24 years. Five patients did not use any analgesics at all. One female patient, 23 years old, developed an vestibular abscess 5th day after surgery.

	Swelling	Range of mouth opening
2nd day	8%	62%
7th day	2%	91%

Table 1. Average range of mouth opening and postoperative swelling measured on the 2nd and 7th days following third molar surgery

DISCUSSIONS

This clinical investigation shows that odontectomy of the lower third molar is a treatment that safely can be done as outpatient procedure under local anaesthesia. The duration of the odontectomies did not exceed the duration of impacted wisdom teeth

surgery described by other authors 3,4. The difference in duration between the two groups, 17-20 and 21-24 years, shows that the surgery difficulty increases with increasing lower third molar root development (Figure 1).

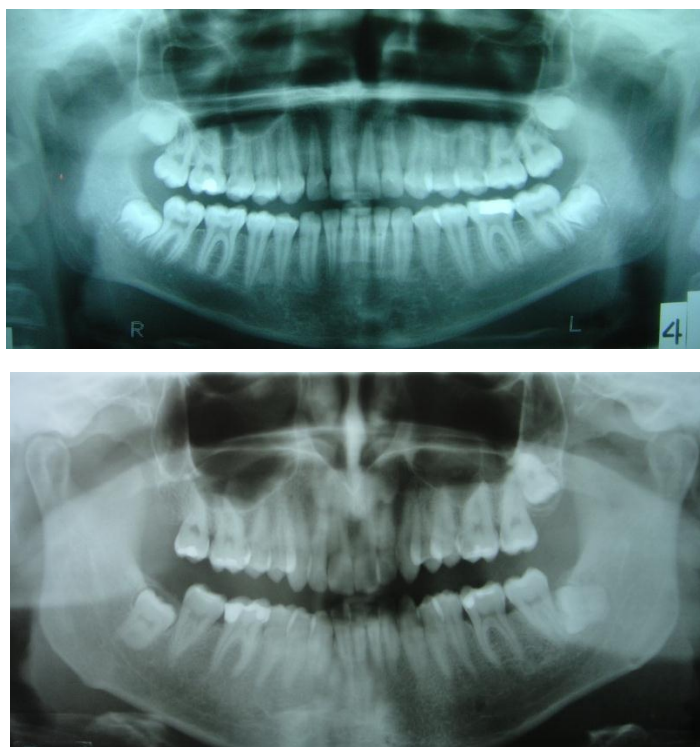


Fig.1. Orthopantomograms illustrate the root development of the lower third molar
a. 18 years old patient; b. 23 years old patient

When the patients were in the age group 17-20 years, lower third molars are located relatively superficially and the roots are not complete formed.

On performing odontectomies, we should take in consideration the psychological reactions the patients may relate to lower third molar surgery. Our results have shown a complication rate following lower third molar surgery under 1%. We have to mention that number operated in this series is small, but it gives an indication of the postsurgery problems. The range

of motion of these patients showed more reduction compared with similar studies 5,6,7,8. An explanation for this is that our study was carried out with bilateral lower molars odontectomies.

Swelling after odontectomy was moderate and showed normalization of the clinical aspect a week after surgery, except for one patient who developed an vestibular abscess on the 5th postoperative day.

The need for analgesics was small overall, probably due to the atraumatic surgery.

CONCLUSIONS

Even lower third molar odontectomy is a low morbidity procedure, the risk of complications exist. Thorough preoperative

evaluation of the case and accurate operative technique are of major importance to limit the incidence of surgery complications.

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INCIDENCE AND PREVALENCE OF DENTAL CARIES IN ARAD PUPILS EPIDEMIOLOGICAL APPRECIATION CONCERNING DENTAL CARIES AT THE 6 YEAR MOLAR TOOTH



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ABSTRACT

Dental decay is a disease caused by multiple factors as diet, microorganism, tooth morphology, saliva, social, environmental and cultural factors.

There were made inquiries and research which can offer important information concerning teeth health of a specific population. Thus, it is possible to establish oral health plans in order to act according to real needs of the population. The decay of the first permanent molar is considered an important factor which let us to determine an individual propensity to dental decay.

In 2008 we initiated an epidemiological study regarding the frequency of dental decay of 6 year molar tooth to pupils aged between 7 to 12. From all existing schools (496), we included in the study a number of 12, involving 1872 pupils.

Keywords: decay incidence, the first permanent molar, temporary molar.

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INTRODUCTION

The study included a number of 1872 children, on an average of 156 children per school. It has been used the clinic dental examination method. The method has been performed by dentists according to World Health Organization criteria. The average age of children was 8.6 years old . Frequency of dental decay spots at the first molar was 32,88%. The frequency increases constantly proportionally with subject' s age. It's been observed an higher frequency of decay at first mandibular molar compared to its jaw homologue. It also been observed a higher frequency of decay at 6 year molar at children attending public schools reporting to the ones who attending private schools. They took into account the following elements:

- the moment of the arch tooth appearance (to determine high risk periods)
- sex
- the presence of sealing materials
- reports on oral hygiene habits

It has been pointed out that the first permanent molar is the most liable to caries in the permanent dentition, probably as a result of its morphological characteristics, and also of its early exposure. The appearance of permanent molars on the arch has been influenced by temporal molars situation. Over 50% of children age over 11 years old who have been examined have caries at the 6 year molar. This is the reason why the

restoration and treatment of this teeth has to be done even from mix dentition period. In this cases we will take into consideration the stage of mix dentition. Premature extraction of the first permanent molars can result in unfavorable changes of occlusion in the situation when the spaces left after extraction are not denture. The orthodontics consider that premature extraction of the first superior molar is not advisable because the resulting space is situated far from labial segments. Yet, technically, the space which appear after extraction can help the teeth with dental alveolate incongnity to set in line. The purpose of this study is to observe the frequency of caries at the 6 year molar and to present the consequences of the premature extraction of the first permanent molar, in order to permit the planning of extraction at the right time.

Consequences of losing the first permanent molar

The ideal moment for the extraction of the first permanent molar is before eruption of the permanent second molar, usually at the age of 8 to 9 years. In this way the second permanent molar may erupt early and a contact area between it and the second premolar can be established. At this stage even a distal displacement of the second premolar can be observed , especially when there is a dental crowding in this part.

MATERIALS AND METHODS

For this study we chose randomly from the 496 public and private schools a total of 12 students aged between 6 and 12 years. Schools are located in

both urban and rural. Participants and their parents were informed about the nature of the study and were given a consent form that they had to sign.

Then followed the clinical examination, which has conducted in the classes where students learn, using fluorescent light and single use consultation kits . They where used in order to detect caries and absence or restorations of the first permanent molar. From this date, in order to understand the personal profile of pupil and his dental status, we centralized the dental files of each pupil which present at least a caries lesion of the 6 year molar. The results where centralized in a table containing the following data:

- Name, father's initial, surname
- Date of birth, age, sex
- Full address
- Where learning

- Examination date
- Diagnosis
- Start date therapeutic treatment
- The treatment, evolution
- Associated diseases

Dental examination was performed by several physicians and a nurse trained in patient records. For accuracy calibrations were made before and during trials. I did re-examination randomly to one of 25 children, to have a more precise control over the correctness of the examiner. Primary molars that had on their surface early lesions (brown spots of color) and that could not be safely diagnosed as positive, were excluded from the study.

Table 1. Administrative distribution of studied schools

School	Urban	Rural
Public School	2	8
Private School	2	0
total	4	8

Table 2. The age and sex distribution of study subjects

Age groups	Number of students examined	Girls	Boys
7 y.o.	345	182	163
8 y.o.	289	172	117
9 y.o.	371	213	158
10 y.o.	251	111	140
11 y.o.	368	211	157
12 y.o.	248	115	133
total	1872	1004	868

Table 3. Number of pupils presenting caries lesions

	Number of pupils	%
Pupils with cavities	1168	62,4
Pupils without cavities	704	37,6
total	1872	100

Table 4. Clinical situation of the first permanent molar according to age of the subject analyzed

Age	No. of pupils examined	No. of teeth examined	No. of 1 molar examined	Caries at 1 molar	Caries at 1 molar %	Caries at 1 molar boys	Caries at 1 molar girls	1 molar treated	1 molar extracted
7	345	6555	1380	264	5,52	101	163	8	0
8	289	5780	1156	258	3,45	124	134	212	0
9	371	7420	1468	384	5,13	215	169	42	16
10	251	5271	980	405	5,41	216	189	53	24
11	368	7728	1434	524	7,00	281	243	75	38
12	248	5456	940	627	8,37	451	176	342	52
total	1872	38210	7488	2462	32,88	1388	1074	541	130

Table 5 the placement on the arch of the situation of the first permanent molar

		Caries at 1 molar		1 molar extractions		1 molar restoration	
Dental arch	Number of 1 molar examined	number	%	number	%	number	%
Upper jaw	3744	1054	14,08	49	0,65	173	2,31
Mandible	3744	1408	18,80	81	1,09	368	4,91
total	7488	2462	32,88	130	1,74	541	7,22

Table 6 the placement of the caries on the tooth surface at first permanent molar on the arch

Caries at 1 molar	occlusal	%	mesial	%	distal	%	vestibular	%	palatal	%	lingual	%
Upper jaw	432	35,35	217	45,68	288	48,65	52	61,90	65	100		
Mandible	790	64,65	258	54,32	304	51,35	32	38,10			24	100
total	1222	100	475	100	592	100	84	100	65	100	24	100

	Caries	Extractions	Restorations
Upper jaw	1054	49	173
Mandible	1408	81	368

Table 7 the placement of the caries on the tooth surface at first permanent molar

CARIES MOLAR 1	occlusal	%	mesial	%	distal	%	vestibular	%	palatal	%	lingual	%
2462	1222	49,63	475	19,29	592	24,05	84	3,41	65	100	24	0,97

RESULTS

From all 1872 examined pupils, 32,88 % have caries at different evolutionary stages, at the first permanent molar. We can see an increase in incidence of dental caries in the first permanent molar with age. For age groups of 7, 8 and 9 years old, there are no significant differences. In the 5 table we can see a differences between frequency of the carries localized at the first permanent molar

as it is mandibulary or maxillary. In the 6 table we see the frequency of the caries as they are localized occlusal or proximal. We also can compare the frequency of the caries at the pupils who frequent public or private schools, taking into consideration their economic and educational level, according to the social group they came from.

DISCUSSIONS

This study have made an investigation related to presence of the caries at the first permanent molar, at the pupils, on age groups , the localization of the caries, differences that can be observed according to subject's sex, social and educational environment of them.

This study has been made exclusively for the first permanent molar, because it's presence on the arch is essential to occlusion stability and for the dental health of each person. It is the first permanent tooth which erupt on the arch behind the temporal teeth and thus it directs the eruption of the other permanent teeth.

Moreover, at the moment it appears on the arch, it is the most voluminous tooth, and thus it take over the maximum task of occlusion. By its position on the arch, it influences the stability of vertical dimension and thus the aesthetics proportion of individual physiognomy. The health of this tooth is a basic oral health assessment of

children because it is one of the most vulnerable to decay by its morphological and functional characteristics. The fact that at the age of 9 we find very frequent carried first molars, can be explained by the fact that the carious process is a is cumulative and continuous one.

The study show us a very important thing, that is the frequency of the disease at the first permanent molars, as they can be decayed, treated or extracted is much higher compared to their upper jaw homologues. I consider that this situation is due morphology and eruption time. Lower first permanent molar has an occlusal relief with several trenches and pits, highly retentive areas. It appears on the arch slightly earlier as counterpart jaw and is constantly exposed to the oral environment, making it more susceptible to decay. Age at which it appears is one at which the child is not aware of the importance of proper oral hygiene.

CONCLUSIONS

1. There is a high rate of prevalence of caries in permanent first

molars among school children examined in this study.

2. First permanent molar caries prevalence increased with patient age.

3. We have a prevalence rate of caries in first permanent mandible molars larger than counterparts jaw.

4. Students who come from family environments with a high social, economic or cultural have a prevalence rate of caries in the first permanent

molar lower than children who come from family environments with low economic and cultural.

5. If it is necessary to first molar extraction, should be considered if there is possibility of applying braces. Each case must be assessed properly to keep the midline dental and prevent occlusion change.

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DIABETES AND BACTERIAL CONTENT OF PERIODONTAL POCKETS



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ABSTRACT

Diabetes and periodontitis seem to have a bidirectional relationship. The influence of diabetes as a risk factor for periodontitis has many aspects to be studied, the bacterial content in periodontal pockets being just one of them. Aim and objectives : To compare the subgingival bacterial content of healthy periodontium diabetics with that from periodontal pockets of people with periodontitis, with or without diabetes. Material and methods : 60 people between 25 and 49 years old were divided in 3 groups : control group GC with periodontitis and without diabetes, DFP with diabetes and without periodontitis and DP-with periodontitis and diabetes. The periodontal parameters were measured. The bacterial content was examined by PCR. Results : total number of bacteria was higher in diabetes with periodontitis group, prevalence of bacteria was not influenced by diabetes. Conclusions : Diabetes seems to have its contribution in aggravating the periodontal disease especially when metabolic control is not good. The bacterial prevalence seems not to be changed by diabetes, but the total number of bacteria raised significantly in groups with diabetes and periodontitis.

Keywords: periodontitis, diabetes, bacteria

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INTRODUCTION

Diabetes and periodontitis are both chronic complex diseases, and studies show enough evidence that there is a bidirectional relationship between them. Studies highlight that patients with diabetes mellitus have a more severe and greater prevalence of periodontitis. Also, it seems that persons with periodontitis have a greater prevalence of diabetes, and diabetic people with periodontitis have less control of glycemia.

Periodontitis, the sixth complication of diabetes, can alter the systemic physiology of diabetic patients. Because periodontitis can be more than a localized oral infection, the hypothesis about its long distance effects raises. Periodontitis can be a source of bacteria and metabolic bacterial products that can be disseminated during the destruction of dental sustaining apparatus. Periodontal pathogens are generating the advanced destruction of hard and soft periodontal tissues by the means of a large quantity of virulence factors.[1,2]

Lots of bacteria can be found in periodontal pockets, but those

responsible for periodontal disease are few, especially gram negative anaerobic bacteria, some facultative gram positive, anaerobic cocci, facultative gram negative bacteria like : Aggregatibacter (former Actinobacillus) actinomycetemcomitans, Porphyromonas gingivalis, Prevotella intermedia, Actinomyces naeslundii, Bacteroides forsythus, Campylobacter rectus, Eikenella corrodens, Fusobacterium nucleatum, Peptostreptococcus micros, Selenomonas sputigena, Streptococcus intermedius, Eubacterium spp., Treponema spp.)

Interrelationship between diabetes and periodontitis is an example of the way a systemic disease is a risk factor for an infection, and once the infection established, it exacerbates the progression of the systemic disease.[1,3]

Aim and objectives

To compare the subgingival bacterial content of healthy periodontium diabetics with that from periodontal pockets of people with periodontitis, with or without diabetes.

MATERIALS AND METHODS

The study included 60 patients, 28 men and 32 women, aged between 25 and 49 years old. All of them were divided in three groups-control group GC included 20 people without diabetes and with periodontitis, 20 people with diabetes but without periodontitis DFP and 20 people with diabetes and periodontitis DP.

In the groups with periodontitis were allowed only those with 2 or more teeth having periodontal pockets of four or more mm. Exclusions were for

those with antibiotic treatments, or antiepileptic, immunosuppressive medication during last year. Persons with liver disease, kidney disease, leukemia, neutropenia or genetic problems were not allowed in the study because of changes in periodontal status at such people, which can modify the results of the study.

Also, the limit of age was 25-49 years, under 25 was considered short time since the disease started, and over

49 years too many complications of diabetes.

The hygiene was similar and the patients did not benefit of some kind of periodontal treatment during last 6 months. The next measurements were made to each patient: attachment loss PA, probing depth PD, bleeding index IS (Muhlemann), plaque index IP (Silness Loe), HbA1c for diabetic groups. Each patient was asked since when has diabetes, type of diabetes and treatment. The bacterial content was taken from periodontal pockets, with depth 4 mm or more. The tooth was isolated, dried with a cotton roll, and a sterile paper cone inserted in periodontal pocket for 30 seconds. The paper cone was introduced in a sterile plastic tube, delivered by laboratory. The analysis was made with polymerase chain reaction PCR, in this case allowing the detection of 11 periodontal pathogens, the most important in periodontal disease. They were : Actinobacillus actinomycetemcomitans (Aggregatibacter

actinomycetemcomitans), Porphyromonas gingivalis, Tannerella forsythensis (Bacteroides forsythus), Treponema denticola, Prevotella intermedia, Peptostreptococcus micros, Fusobacterium nucleatum \ periodonticum, Campylobacter rectus, Eubacterium nodatum, Eikenella corrodens, Capnocytophaga species (gingivalis, ochracea, sputigena).

The bacteria were grouped in complexes by Socransky et al. [4] like this :

-red complex : Porphyromonas gingivalis \ periodonticum, Tannerella forsythia, Treponema denticola,

-green complex : Eikenella corrodens, Capnocytophaga species (gingivalis, ochracea, sputigena)

-orange complex : Prevotella intermedia, Peptostreptococcus micros, Fusobacterium nucleatum \ periodonticum,

-orange associated complex : Campylobacter rectus, Eubacterium nodatum

-total orange complex : orange and associated orange complex.

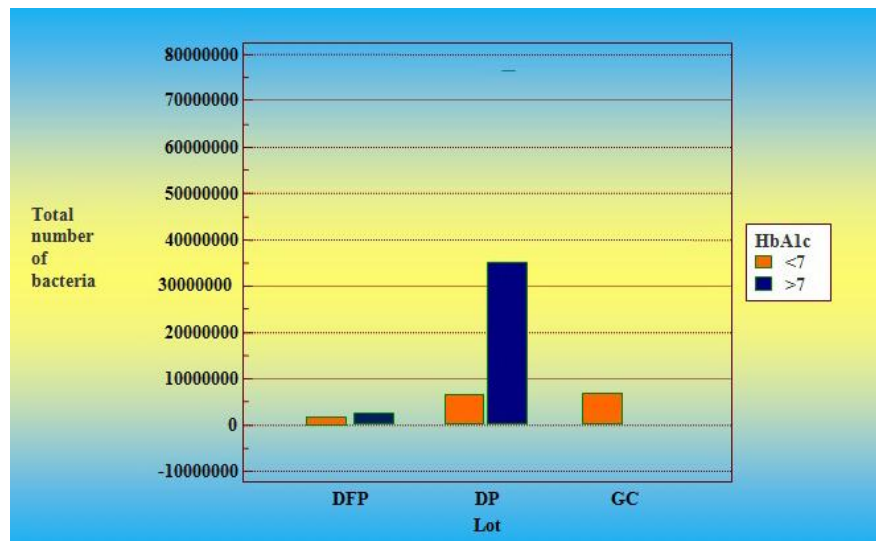
RESULTS

Total number of bacteria of study groups is the highest in DP group, followed by control group CG (with periodontitis) and the lowest values in DFP group (diabetes without periodontitis). One can see that periodontitis and diabetes with periodontitis influence the development of periodontal pathogens. The attachment loss was the highest in DP group, followed by control group without diabetes but with periodontitis. Probing depth was higher in periodontitis groups, with values raised but not statistically significant at diabetics. The hygiene and plaque index obtained higher

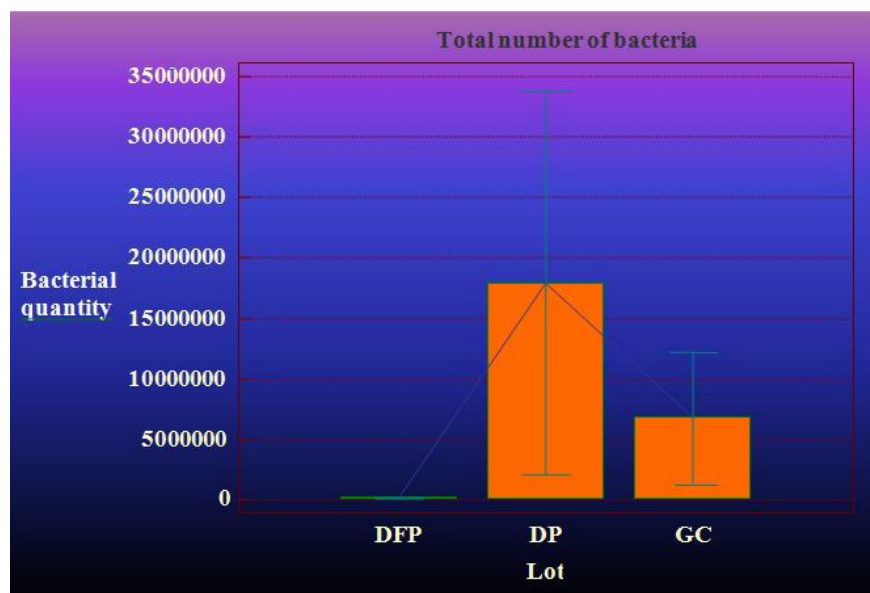
scores in periodontitis groups. Bleeding index raised itself the most in DP group, pleading for diabetes as an aggravating factor for periodontitis.

The lower the metabolic control, the more was the growth of total number of bacteria detected and the more advanced periodontitis was found. The following bacteria showed statistical significant differences in prevalence between groups: Eikenella corrodens, Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis, Treponema denticola, Prevotella intermedia, Peptostreptococcus micros, Fusobacterium nucleatum.

Graphic nr. 1 : Comparison between total number of bacteria and metabolic control of diabetes

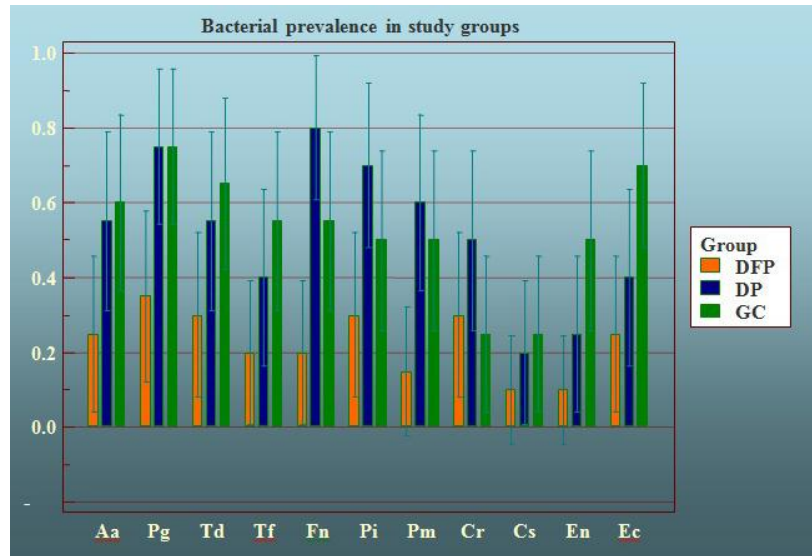
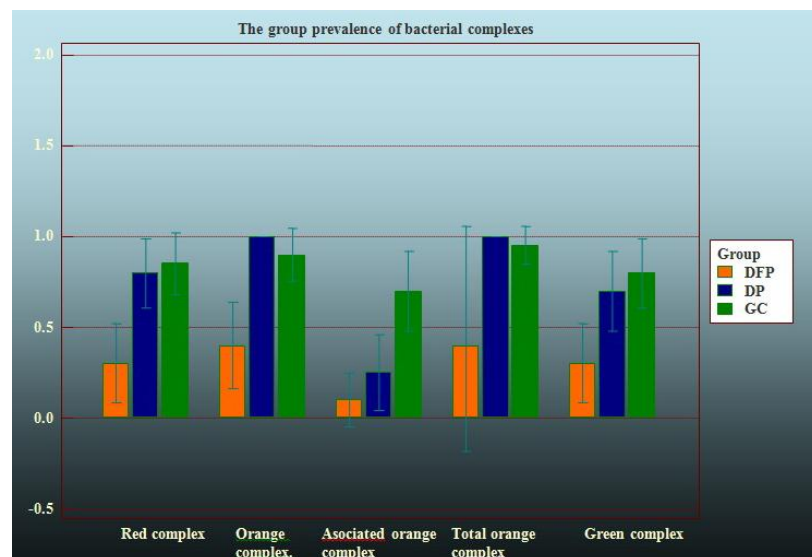


Graphic nr.2 : Total number of bacteria of study groups



The following bacteria showed statistical significant differences in quantity between groups: Porphyromonas gingivalis, Eikenella corrodens, Fusobacterium nucleatum, Prevotella intermedia, Peptostreptococcus micros, Eubacterium nodatum. Porphyromonas gingivalis și Fusobacterium nucleatum had higher

counts in DP. Eikenella corrodens, Prevotella intermedia, Peptostreptococcus micros, Eubacterium nodatum were best represented in quantity in GC group, followed closely by DP. Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis, Treponema denticola had the same prevalence in DP and GC.

Graphic nr.3 : The bacterial prevalence in the groups**Graphic nr.4 :** Bacterial complexes prevalence

Eikenella corodens had greater prevalence in GC group. Prevotella intermedia, Fusobacterium nucleatum had greater prevalence in DP group. Red complex was best represented in quantity in the folowing increasing order: DFP, GC- because of Porphyromonas gingivalis, Tannarella forsithensis, then DP because of Porphyromonas gingivalis. Orange complex and total orange complex was

highest in number at DP because of Fusobacterium nucleatum, folowed by GC (especially Fusobacterium nucleatum and Prevotella intermedia). Green complex (Capnocytophaga species, Eikenella corrodens) was the same in periodontitis groups and reduced in DFP group. The prevalence of bacterial complexes except for asociated orange complex was the same in DP and GC and lower in DFP group.

Bacterial species	Group					
	DFP		DP		GC	
Nr. bact. x 10 ⁴	Medium	Stand. dev.	Medium	Stand. dev.	Medium	Stand. dev.
Aa	7000.00	22266.33	20800.00	40686.9952	10720.50	30612.56
Pg	17000.00	35997.07	12507600.00	30236967.04	2701650.00	4340883.0
Tf	11000.00	30590.6763	561100.000	2232811.9844	1063000.000	3064407.0432
Td	7500.000	22213.0829	73000.000	221718.1710	53300.000	222874.5458
Pi	25000.500	44425.8697	875002.000	2197336.0666	1215500.000	3030383.8128
Pm	6000.000	22337.1298	415500.000	490826.1028	518000.000	2232111.5799
Fn	11000.000	30590.6763	3315500.000	4508350.7020	1076500.000	3059697.7405
Cr	21000.000	40639.6229	81500.000	220937.5954	52000.000	223173.2865
En	5500.000	22354.7946	15100.000	36592.9243	27050.000	43387.4527
Ec	11500.000	30482.9547	61800.000	222890.2491	88000.000	219535.3946
Cs	5500.000	22354.7946	6500.000	22307.6574	11500.000	30482.9547
Red complex	7500.000	22213.0829	12641525.000	32097511.6208	3817950.000	6710376.3599
Orange complex	42000.500	76474.6811	4606002.000	4258180.4337	2810000.000	5479498.6325
Asociated orange complex	5500.000	22354.7946	15100.000	36592.9243	79050.000	220981.4174
Total orange complex	47500.500	77314.8212	4615601.500	4250096.9516	2889050.000	5551093.8844
Green complex	17000.000	48460.5102	68650.000	224377.3314	99500.000	219915.6537
Total nr. of bacteria	128000.500	109284.187	17933402.000	33898671.8997	6817220.500	11535329.6253

CONCLUSIONS

Diabetes seems to have its contribution in agravating the periodontal disease especially when metabolic control is not good. The bacterial prevalence seems not to be

changed by diabetes, but the total number of bacteria raised significantly in groups with diabetes and periodontitis.

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TRACKING THE HEALING PROCESS IN 3 TYPES OF FLAPS IN ORAL SURGERY



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ABSTRACT

In oral surgery various types of flaps are used. The present study follows the healing process of 3 types of flaps commonly used in oral surgery, tries to identify complications, their severity and causes for their occurrence. Three main types of flaps were chosen, performed and followed: semilunar (with up or down convexity), Ochsenbein-Luebke (L-shaped or trapezoidal), intrasulcular (L-shaped or trapezoidal). The semilunar flap proved to be most inadvisable to use.

Key Words: oral flaps, healing process

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INTRODUCTION

The flap is a piece of tissue, of variable form, which is dissected from origin, but remains bound to the tissue of origin through a nutrient pedicle. In oral surgery various types of flaps are used, most of them being made on the alveolar ridge mouth front, less on the oral front.

Their role, in most cases, is to create access to the area one wants to intervene surgically.

Making the flaps follows several stages:

1. the incision – is usually done with scalpel blades no. 11, 12 and/or 15, the surgeon having pre-established the image of the flap design; the incision involves both the mucosa and the underlying periosteum; the incision is preferably made in a single step, thus avoiding fringing the flap's edges; also a total control on the direction and force applied on the scalpel blade at the time of incision is required.

2. bone rasping – is done usually with the periosteal elevator; both the mucosa and the periosteum are rasped denuding the underlying bone; bone rasping is done carefully avoiding fringing the flap's edges or even its breaking.

3. flap distancing – keeping at a distance both the flap and neighboring soft parts (lips, cheeks, etc.), so as not to come into contact with instruments used during surgical maneuvers.

4. repositioning and suturing – the flap is reapplied to its original position and kept so by suture; there can be used various techniques of suturing, wires made of different materials, needles of various shapes and sizes, depending on the surgeon's preferences and experience. Among complications that can occur in healing flaps we include: flap necrosis or a portion thereof, dehiscence, gingival retraction.

OBJECTIVE

The present study follows the healing process of 3 types of flaps commonly used in oral surgery, tries to

identify complications, their severity and causes for their occurrence.

MATERIALS AND METHODS

The study was conducted in CMF Timișoara Clinic on a total of 15 patients (4 men, 11 women), on which a total of 17 flaps were performed.

Three main types of flaps were chosen, performed and followed: semilunar (with up or down convexity), Ochsenbein-Luebke (L-shaped or trapezoidal), intrasulcular (L-shaped or trapezoidal).

Healing of flaps, complications that occurred, and aesthetic consequences were followed over a period of 6 months (from 7 days, to 3 and 6 months); 33% of the patients did not show up for the 6 months' follow-up but were selected for the study, the healing process being considered completed.

Intrasulcular flap*Semilunar flap**Ochsenbein-Luebke flap*

The parameters monitored during the healing process were: scar appearance, dehiscence, gingival retraction, flap

necrosis; each of these parameters was noted, depending on severity, as follows:

Scar	3-unnoticeable scar	2-slightly visible scar	1-unaesthetic scar
Dehiscence	3-no dehiscence	2-slight dehiscence	1-severe dehiscence
Gingival retraction	3-no gingival retraction	2-minimum gingival retraction	1-severe gingival retraction
Necrosis	3-no necrosis	2-partial flap necrosis	1-total flap necrosis

RESULTS

Annotations for each flap in turn are presented in the following table:

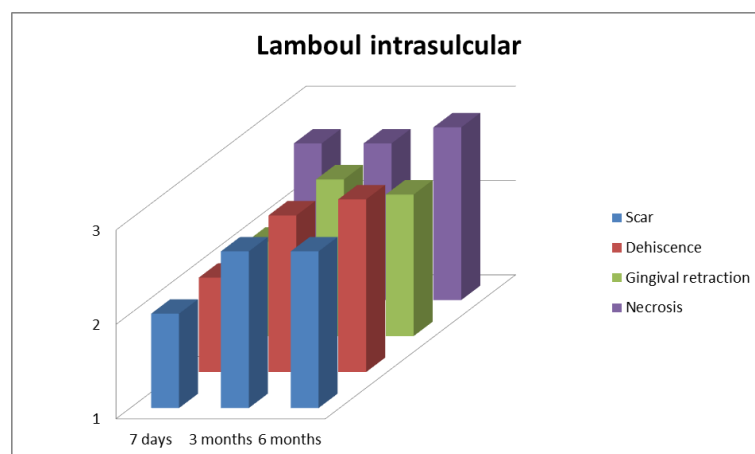
Type of flap	Caz clinic	Scar	Dehiscence	Gingival retraction	Necrosis
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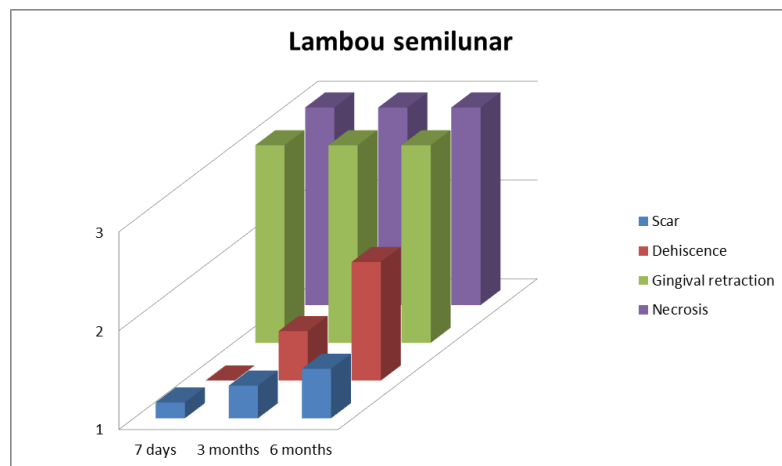
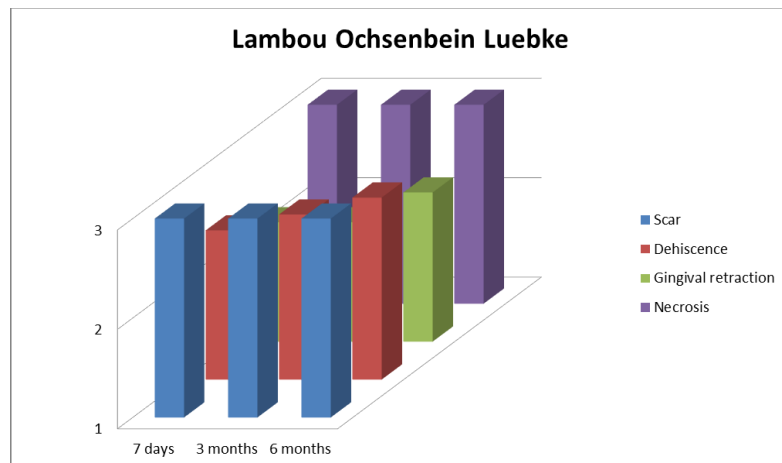
Intrasulcular flap	I	3	3	3	3
	II	1	2	1	2
	III	3	3	3	3
	IV	3	3	2	3
	V	3	3	2	3
	VI	3	3	3	3

Ochsenbein-Luebke flap	I	3	3	3	3
	II	3	3	3	3
	III	3	1	1	3
	IV	3	3	3	3
	V	3	3	2	3
	VI	3	3	3	3

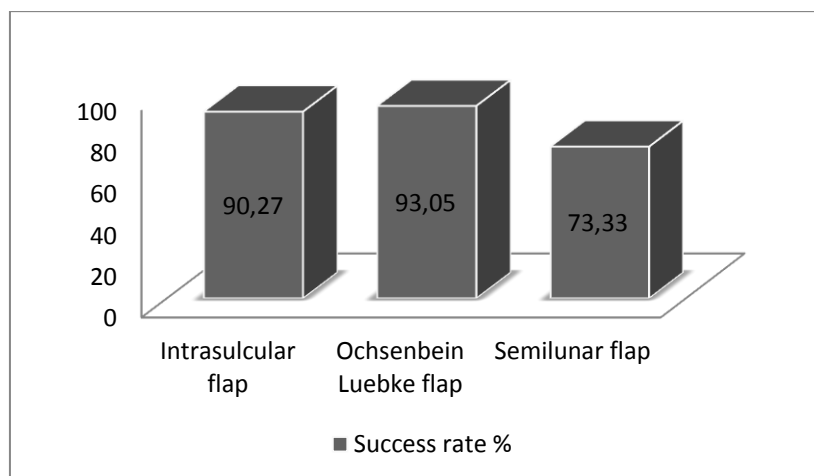
Semilunar flap	I	1	1	3	3
	II	2	1	3	3
	III	2	1	3	3
	IV	1	1	3	3
	V	3	1	3	3

The evolution of targeted parameters, over a period of 6 months, was as follows:





Depending on the score obtained, a success rate at 6 months of each flap in turn was calculated (the 100% success rate representing the maximum score)



CONCLUSIONS

The semilunar flap proved to be most inadvisable to use. Factors that have contributed to complications in healing of flaps were:

- incorrect and incomplete preoperative evaluation
- surgical rush

- surgical technique errors (incorrect repositioning of the flap, making the stitches too tight)

- insufficient importance to aesthetics

- patient's failure to comply with postoperative instructions.

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COMPARATIVE EVALUATION OF PERIODONTAL REGENERATION IN MANDIBULAR CLASS II FURCATION DEFECTS USING ENAMEL MATRIX PROTEINS AND AN OILY CALCIUM HYDROXIDE SUSPENSION. A PILOT STUDY.



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ABSTRACT

The aim of this study was to compare the clinical outcomes of an oily Calcium hydroxide suspension (OCHS) (test group) to enamel matrix proteins derivate (EMD) (control group) applied in human mandibular Class II furcation defects. 7 patients suffering from chronic periodontitis with a total of 9 class II furcation defects were treated in this randomized pilot clinical trial, in 2 groups: the test group were treated with an OCHS (Osteora®, DFS Diamon, Riedenburg, Germany) and the control group were treated with EMD (Emdogain®, Straumann AG, Basel, Switzerland). At baseline and six months after the surgery, follow clinical parameters were measured: plaque index (PII), bleeding on probing (BOP), vertical pocket depth (PD), vertical clinical attachment level (CAL vert.), horizontal clinical attachment level (CAL horiz.) and position of the gingival margin (GR). The intra-surgical parameters measured at baseline were: horizontal defect depth (HDD), vertical defect depth (VDD), position of the bottom of the defect (CEJ-BD) and position of the alveolar crest (CEJ-BC). All this data were analysed and correlated using statistical tests. Conclusions: The present study demonstrated that both materials were similarly successful in treating human mandibular Class II furcation defects. However, the data suggest a slight but non-statistical clinical benefit for the EMD group.

Key words: oily calcium hydroxide suspension, enamel matrix proteins, periodontal regeneration, furcation defects.

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INTRODUCTION

Various treatments have been proposed for the treatment of class II furcation defects, but only the regeneration is the treatment of choice in this type of defect. Recent systematic reviews and clinical studies have shown that the use of EMD in furcations results in more reduction in horizontal furcation defects depth when compared with resorbable membranes (Koop et al. 2012) and with OFD (Casarin et al. 2010) respectively. On the other hand, recently an oily Calcium hydroxide suspension (OCHS) has also been supposed to support periodontal regeneration. Applied to the root surface in conjunction with

surgical periodontal therapy, the OCHS resulted in statistically significant higher pocket depth reductions and clinical attachment level gains than access flap surgery alone (Stratul et al. 2006). However, in a very recent study, a OCHS therapy in conjunction with access flap surgery is compared with access flap surgery alone, in the treatment of class II furcation defects (Amoian et al. 2011). The authors found no difference between the test and control site.

So far, there is no clinical comparison between EMD and the OCHS in treating of human furcation defects.

MATERIALS AND METHODS

A total of 9 furcations (5 tests and 4 controls) in 7 patients suffering from chronic periodontitis were treated in this randomized pilot clinical trial. Furcation in the test group were treated with an oily Calcium hydroxide suspension (Osteora®, DFS Diamon, Riedenburg, Germany), while furcations in the control group were treated with enamel matrix proteins (Emdogain®, Straumann AG, Basel, Switzerland) (Fig.1-6).

The surgical procedure. After anesthetizing the surgical area, a sulcular incision was made. Flaps are reflected full thickness to expose the underlying furcation defect and allow access for thorough debridement of the defects and meticulous root planning. Once the defect has been debrided of soft tissue and the tooth root surfaces thoroughly planed to remove all deposits of dental plaque and calculus, the bone replacement graft material is packed into the defect to fill the defect

to the level of the remaining alveolar bone. In EMD site, ethylenediaminetetraacetic acid (EDTA; 24%) (PrefGel™ Straumann AG, Basel, Switzerland) was applied to the root surface for 2 min as a root conditioner. The root surface was thoroughly rinsed with sterile saline. After injection of EMD gel to the furcation area, the flap was returned to its place immediately and sutured. Treatment protocol for OCHS site was like EMD site but EDTA was not utilized. The patients were checked each week during the first month and thereafter monthly till the sixth month.

Clinical parameters. Plaque index (PII), bleeding on probing (BOP), vertical pocket depth (PD), vertical clinical attachment level (CAL vert.), horizontal clinical attachment level (CAL horiz.), position of the gingival margin (GR) were among the clinical parameters measured prior and six months after the surgery. The

horizontal defect depth (HDD), vertical defect depth (VDD), the position of the bottom of the defect (CEJ-BD) and position of the alveolar crest (CEJ-BC) were measured at baseline. The extra-surgical data were analysed by the non-parametrical statistical tests Wilcoxon

Signed Ranks Test and Mann-Whitney Test while a p value less than 0.05 was considered significant. The intra-surgical data at baseline were correlated with the extra-surgical data at baseline and after 6 months using the Spearman's rank correlation.

RESULTS

No adverse healing response was observed in any of the patients. Postoperative measurements at 6 months, revealed that the mean reduction for PD of the control and test

groups was 3.50 +/- 1.91 and 2.60 +/- 3.13, and for CAL vert. 3.50 +/- 1.73 and 3.20 +/- 1.64 and CAL horiz. 2.50 +/- 1.73 and 1.00 +/- 1.58, respectively.

OST			
Clinical Parameter	Mean	Std. Dev.	p
PII baseline	0,60	0,55	
PII 6 months	1,20	0,45	
DIFF PII	-0,60	0,89	n.s.
BOP baseline	0,80	0,45	
BOP 6 months	0,60	0,55	
DIFF BOP	0,20	0,45	n.s.
PD baseline	6,60	2,70	
PD 6 months	4,00	1,87	
DIFF PD	2,60	3,13	n.s.
CALvert. baseline	8,60	3,05	
CALvert. 6months	5,40	1,67	
DIFF CALvert.	3,20	1,64	p<.05
CALhoriz. baseline	6,60	2,30	
CALhoriz. 6 months	5,60	1,95	
DIFF CALhoriz.	1,00	1,58	n.s.
GR baseline	2,20	0,84	
GR 6 months	1,80	1,30	
DIFF GR	-0,40	1,14	n.s.
HDD	6,60	2,19	
VDD	3,40	1,82	
CEJ_BD	10,20	3,63	
CEJ_BC	6,80	1,92	

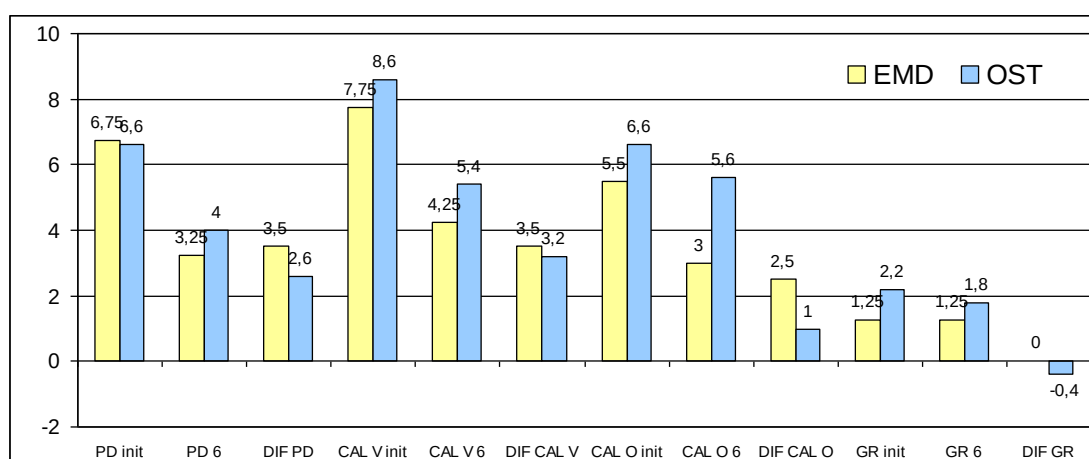
EMD			
Clinical Parameter	Mean	Std. Dev.	p
PII baseline	0,25	0,50	
PII 6 months	0,00	0,00	
DIFF PII	0,25	0,50	n.s.
BOP baseline	0,50	0,58	
BOP 6 months	0,25	0,50	
DIFF BOP	0,25	0,50	n.s.
PD baseline	6,75	1,71	
PD 6 months	3,25	0,96	
DIFF PD	3,50	1,91	n.s.
CALvert. baseline	7,75	1,26	
CALvert. 6months	4,25	1,26	
DIFF CALvert.	3,50	1,73	n.s.
CALhoriz. baseline	5,50	2,08	
CALhoriz. 6 months	3,00	0,82	
DIFF CALhoriz.	2,50	1,73	n.s.
GR baseline	1,25	0,96	
GR 6 months	1,25	1,50	
DIFF GR	0,00	0,82	n.s.
HDD	5,50	1,73	
VDD	3,50	0,58	
CEJ_BD	8,50	1,91	
CEJ_BC	5,00	1,41	

Differences EMD - OST		
Clinical Parameter	Mean	
PII baseline	-0,35	n.s
PII 6 months	-1,20	0.05
DIFF PII	0,85	n.s.
BOP baseline	-0,30	n.s
BOP 6 months	-0,35	n.s
DIFF BOP	0,05	n.s.
PD baseline	0,15	n.s
PD 6 months	-0,75	n.s
DIFF PD	0,90	n.s.
CALvert. baseline	-0,85	n.s
CALvert. 6months	-1,15	n.s
DIFF CALvert.	0,30	n.s.
CALhoriz. baseline	-1,10	n.s
CALhoriz. 6 months	-2,60	0.05
DIFF CALhoriz.	1,50	n.s.
GR baseline	-0,95	n.s
GR 6 months	-0,55	n.s
DIFF GR	0,40	n.s.
HDD	-1,10	n.s
VDD	0,10	n.s
CEJ_BD	-1,70	n.s
CEJ_BC	-1,80	n.s

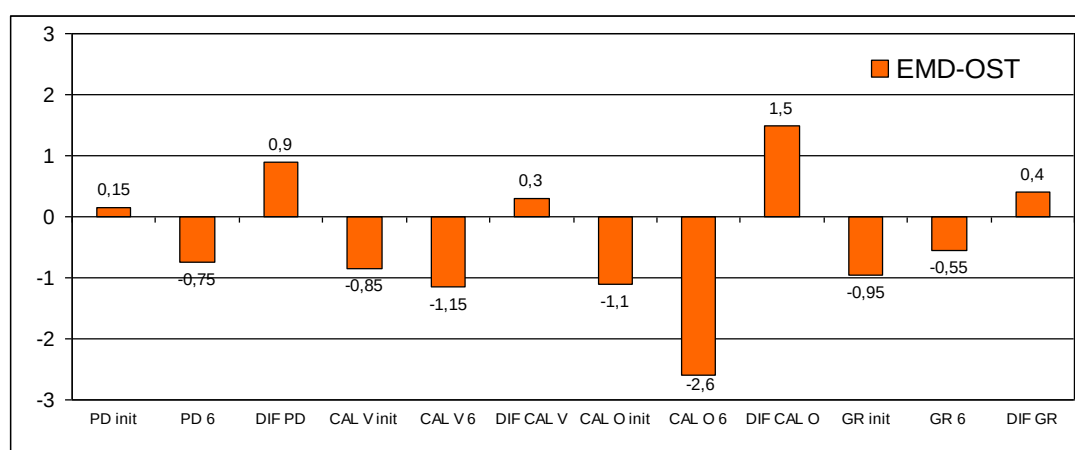
Table 1. The comparison between baseline and 6 months mean values of the clinical parameters in the test (OST) and control (EMD) groups (Wilcoxon Signed Ranks test) and the comparison between the two groups (Mann-Whitney test). (OST = Osteora®, EMD = Emdogain®, PII = Plaque Index, BOP = Bleeding on Probing, PD = Pocket Depth, CAL = Clinical Attachment Level, GR = Gingival Recession, HDD = Horizontal Defect Depth, VDD = Vertical defect Depth, CEJ-BD = Cemento-Enamel Junction – Bottom of the Defect, CEJ-BC = Cemento-Enamel Junction – Bone Crest)

Except the statistically significant CAL vert. modification in the test group ($p < .05$), the control and test treatments resulted in non-significant reductions in measurements at 6 months. There was no statistically significant difference between the two treatments in all clinical measurements

(Table 1). In the test group, a strong positive correlation was found between the variation of CAL vert. and the mean CEJ-BC ($\rho = 0.965$) (Table 2), while in the control group, a strong positive correlation was found between the variation of CAL vert. and the mean VDP ($\rho = 1.00$) (Table 3).



Graph1. The mean values at baseline and at six months of the clinical parameters in the test (OST) and control (EMD) groups.



Graph 2. The differences between baseline and 6 months of the mean values of the clinical parameters in the test (OST) and control (EMD) groups.

Correlations [§]											
		DIF_PL6	DIF_BOP6	DIF_PD6	DIFCAL_V	DIFCAL_O	DIF_GR6	DEF_ORIZ	DEF_VERT	CEJ_BD	CEJ_BC
Pearson Correlation	DIF_PL6	1,000	-,250	-,375	-,068	-,354	-,539	-,408	-,585	-,415	-,232
	DIF_BOP6	-,250	1,000	-,964**	-,953*	-,707	-,686	-,408	-,800	-,892*	-,930*
	DIF_PD6	-,375	-,964**	1,000	-,894*	-,556	-,574	-,467	-,826	-,866	-,855
	DIFCAL_V	-,068	-,953*	-,894*	1,000	-,674	-,587	-,389	-,804	-,913*	-,965*
	DIFCAL_O	-,354	-,707	-,556	-,674	1,000	-,416	-,577	-,174	-,392	-,575
	DIF_GR6	-,539	-,686	-,574	-,587	-,416	1,000	-,320	-,700	-,748	-,752
	DEF_ORIZ	-,408	-,408	-,467	-,389	-,577	-,320	1,000	-,050	-,050	-,142
	DEF_VERT	-,585	-,800	-,826	-,804	-,174	-,700	-,050	1,000	-,970**	-,887*
	CEJ_BD	-,415	-,892*	-,866	-,913*	-,392	-,748	-,050	-,970**	1,000	-,973*
CEJ_BC	-,232	-,930*	-,855	-,965**	-,575	-,752	-,142	-,887*	-,973**	1,000	
Sig. (2-tailed)	DIF_PL6	,	-,685	-,534	-,913	-,559	-,348	-,495	-,300	-,487	-,707
	DIF_BOP6	-,685	,	-,008	-,012	-,182	-,201	-,495	-,104	-,042	-,022
	DIF_PD6	-,534	-,008	,	-,041	-,331	-,311	-,428	-,084	-,058	-,065
	DIFCAL_V	-,913	-,012	-,041	,	-,213	-,298	-,518	-,101	-,030	-,008
	DIFCAL_O	-,559	-,182	-,331	-,213	,	-,486	-,308	-,779	-,514	-,310
	DIF_GR6	-,348	-,201	-,311	-,298	-,486	,	-,599	-,188	-,146	-,142
	DEF_ORIZ	-,495	-,495	-,428	-,518	-,308	-,599	,	-,936	-,936	-,819
	DEF_VERT	-,300	-,104	-,084	-,101	-,779	-,188	-,936	,	-,006	-,045
	CEJ_BD	-,487	-,042	-,058	-,030	-,514	-,146	-,936	-,006	,	-,005
CEJ_BC	-,707	-,022	-,065	-,008	-,310	-,142	-,819	-,045	-,005	,	
N	DIF_PL6	5	5	5	5	5	5	5	5	5	5
	DIF_BOP6	5	5	5	5	5	5	5	5	5	5
	DIF_PD6	5	5	5	5	5	5	5	5	5	5
	DIFCAL_V	5	5	5	5	5	5	5	5	5	5
	DIFCAL_O	5	5	5	5	5	5	5	5	5	5
	DIF_GR6	5	5	5	5	5	5	5	5	5	5
	DEF_ORIZ	5	5	5	5	5	5	5	5	5	5
	DEF_VERT	5	5	5	5	5	5	5	5	5	5
	CEJ_BD	5	5	5	5	5	5	5	5	5	5
CEJ_BC	5	5	5	5	5	5	5	5	5	5	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

a. MATERIAL = OST

Table 2. The Spearman's Rank Correlation analysis of the variations of the mean clinical parameteres values in the test group (OST), at baseline and 6 months after the surgery.

Correlations [§]											
		DIF_PL6	DIF_BOP6	DIF_PD6	DIFCAL_V	DIFCAL_O	DIF_GR6	DEF_ORIZ	DEF_VERT	CEJ_BD	CEJ_BC
Pearson Correlation	DIF_PL6	1,000	-,333	-,522	-,577	-,577	-,000	-,962*	-,577	-,870	-,943
	DIF_BOP6	-,333	1,000	-,870	-,577	-,192	-,816	-,192	-,577	-,522	-,471
	DIF_PD6	-,522	-,870	1,000	-,905	-,302	-,426	-,503	-,905	-,818	-,739
	DIFCAL_V	-,577	-,577	-,905	1,000	-,333	-,000	-,667	1,000**	-,905	-,816
	DIFCAL_O	-,577	-,192	-,302	-,333	1,000	-,000	-,444	-,333	-,101	-,272
	DIF_GR6	-,000	-,816	-,426	-,000	-,000	1,000	-,236	-,000	-,000	-,000
	DEF_ORIZ	-,962*	-,192	-,503	-,667	-,444	-,236	1,000	-,667	-,905	-,953*
	DEF_VERT	-,577	-,577	-,905	1,000**	-,333	-,000	-,667	1,000	-,905	-,816
	CEJ_BD	-,870	-,522	-,818	-,905	-,101	-,000	-,905	-,905	1,000	-,985*
CEJ_BC	-,943	-,471	-,739	-,816	-,272	-,000	-,953*	-,816	-,985*	1,000	
Sig. (2-tailed)	DIF_PL6	,	-,667	-,478	-,423	-,423	1,000	-,038	-,423	-,130	-,057
	DIF_BOP6	-,667	,	-,130	-,423	-,808	-,184	-,808	-,423	-,478	-,529
	DIF_PD6	-,478	-,130	,	-,095	-,698	-,574	-,497	-,095	-,182	-,261
	DIFCAL_V	-,423	-,423	-,095	,	-,667	1,000	-,333	-,000	-,095	-,184
	DIFCAL_O	-,423	-,808	-,698	-,667	,	1,000	-,556	-,667	-,899	-,728
	DIF_GR6	1,000	-,184	-,574	1,000	1,000	,	-,764	1,000	1,000	1,000
	DEF_ORIZ	-,038	-,808	-,497	-,333	-,556	-,764	,	-,333	-,095	-,047
	DEF_VERT	-,423	-,423	-,095	-,000	-,667	1,000	-,333	,	-,095	-,184
	CEJ_BD	-,130	-,478	-,182	-,095	-,899	1,000	-,095	-,095	,	-,015
CEJ_BC	-,057	-,529	-,261	-,184	-,728	1,000	-,047	-,184	-,015	,	
N	DIF_PL6	4	4	4	4	4	4	4	4	4	4
	DIF_BOP6	4	4	4	4	4	4	4	4	4	4
	DIF_PD6	4	4	4	4	4	4	4	4	4	4
	DIFCAL_V	4	4	4	4	4	4	4	4	4	4
	DIFCAL_O	4	4	4	4	4	4	4	4	4	4
	DIF_GR6	4	4	4	4	4	4	4	4	4	4
	DEF_ORIZ	4	4	4	4	4	4	4	4	4	4
	DEF_VERT	4	4	4	4	4	4	4	4	4	4
	CEJ_BD	4	4	4	4	4	4	4	4	4	4
CEJ_BC	4	4	4	4	4	4	4	4	4	4	

* . Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

a. MATERIAL = EMD

Table 3. The Spearman's Rank Correlation analysis of the variations of the mean clinical parameteres values in the control group (EMD), at baseline and 6 months after the surgery.

At six months after the therapy, the sites treated with OCHS showed a reduction in probing pocket depth (PD) from 6.60 ± 2.70 mm to 4.00 ± 1.87 mm and the sites treated with EMD are reduced from 6.75 ± 1.71 mm to

3.25 ± 0.96 mm. Our results are in accord with those obtained by Stratul et al. (2005) in a comparative treatment of deep intrabony defects, using an OCHS and EMD.

CONCLUSIONS

Despite its limited number of cases, this pilot clinical trial demonstrated a slight, although statistically non-significant superiority

of the enamel matrix proteins over the oily calcium hydroxide suspension in treating class II mandibular furcations.

Figure Legends:



Fig. 1. The Class II furcation defect during the ultrasonic debridement



Fig. 2. Application of EMD into the defect



Fig. 3. The sutured flap over the furcation defect.



Fig. 4. The Class II furcation defect during the intra-operative measurement of HDD.



Fig. 5. Application of OCHS into the defect



Fig. 6. The sutured flap over the furcation defect.

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ALL-CERAMIC PARTIAL RETAINER TWO-UNIT CANTILEVERED FIXED PARTIAL DENTURES – A FINITE ELEMENT ANALYSIS



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ABSTRACT

Aim. The objective of this study is to investigate stress distribution and total deformation under occlusal load in all-ceramic partial retainer two-unit cantilevered fixed partial dentures (CFPDs) using the finite element analysis (FEA).

Four different designs of minimally invasive preparations and two different ceramic core materials – YTZP (yttria stabilized polycrystalline tetragonal zirconia) and pressed ceramic (EmaxPress) were evaluated.

Materials and methods. Identical tridimensional maxillary partial models were created, consisting of a missing second premolar and a first molar, corresponding to four abutment preparation designs: occluso-proximal inlay, proximal box, palatal inlay with wings and palatal inlay.

The tridimensional modelling of the abutment teeth, preparations and CFPDs was achieved using Blender 2.58 and Rhinoceros (McNeel North America) NURBS (Non-uniform Rational B-Splines). Resulting geometry was imported in ANSYS FEA software to be used for structural simulations. Material characteristics (enamel, dentin, zirconia, pressed ceramic) were introduced into the computer program and occlusal loading was performed. FEA was conducted and von Mises stress and total deformation were calculated.

Results. The highest stress concentration was observed in the connector area. The results show von Mises stresses ranging from 486MPa to 647MPa for zirconia and 492MPa to 638MPa for pressed ceramic, with the highest stress for the proximal box preparation and the lowest for the palatal inlay with wings preparation. The occluso-proximal inlay preparation displayed the lowest total deformation (4.58µm – zirconia, 5.04 µm – pressed ceramic) and the palatal inlay with wings preparation presented the highest total deformation (5.35µm – zirconia, 5.83 µm – pressed ceramic).

Conclusion: Considering the occlusal forces in the posterior region of the dental arch it appears clinically possible to replace a posterior missing tooth using zirconia CFPDs, successfully restoring both aesthetics and function. Further investigation of pressed ceramic CFPDs regarding the connector's dimensions and geometry needs to be conducted in order to optimize this prosthetic treatment.

Key words: All-ceramic, partial retainer, CFPD, minimally invasive, finite element analysis.

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INTRODUCTION

Whenever wanting to replace a missing tooth in the lateral region of the mouth, the clinician is faced with a range of treatment possibilities (implant, fixed prostheses with various types of retainers – full crowns, partial crowns, inlays, wings, and even removable prostheses) and a great variety of materials and technologies (metal-ceramics, high-strength all-ceramics, fiber reinforced composites), and each of these options has pros and cons. [1, 2, 3] Nowadays, there is a growing tendency among dentists to use minimally invasive techniques, with respect to the oral tissues. This tendency is encouraged by the continuous development and perfecting of dental materials, manufacturing processes and adhesive techniques. At the same time, patients' demand for aesthetically pleasing, tooth-like, biocompatible, conservative and metal-free restorations is increasing.

Several studies state that partial retainer two-unit CFPDs for single tooth replacement are reliable and predictable restorations in the front area of the mouth.[4, 5, 6, 7, 8] Their advantages –greater tooth tissue preservation, easier preparation, better esthetics, better hygiene facilities, easier detection of debonding and secondary caries and reduced twisting forces at the interface, may recommend the use of CFPDs in the lateral area of the mouth.[2] Therefore, it is necessary to find an optimized design for the fabrication of the CFPDs regarding the abutment preparation for the partial retainer and the geometry of the connector.

The study investigates various designs of minimally invasive all-ceramic partial retainer two-unit CFPDs using the finite element analysis, in order to evaluate stress distribution and total deformation under occlusal load.

MATERIALS AND METHODS

Identical tridimensional maxillary partial models were created, consisting of a missing second premolar and a first molar. The models included the outer crown surface and the enamel-dentin interface. Four abutment preparation designs were considered: two with conventional occlusal-cervical insertion axis (1. Occluso-proximal inlay, 2. Proximal box) and two rather innovative ones with a palatal-buccal insertion axis (3.Palatal inlay with wings, 4.Palatal inlay) [9].The 3D-modelling of the abutment teeth was performed using Blender 2.58. Then, the surfaces were reconstructed and the cantilever pontic and preparations were modelled using Rhinoceros

(McNeel North America) NURBS (Non-uniform Rational B-Splines), thus resulting four situations, with three models each. These geometrical ensembles were imported in ANSYS (Ansys Inc., Philadelphia) finite element analysis software to be used for structural simulations. (fig. 1)

The meshing of the tridimensional models resulted in: 35610 nodes and 20155 elements for the occluso-proximal inlay preparation, 35591 nodes and 20270 elements for the proximal box preparation, 35600 nodes and 19880 elements for the palatal inlay with wings preparation and 36949 nodes and 21201 elements for the palatal inlay preparation. (fig. 2).

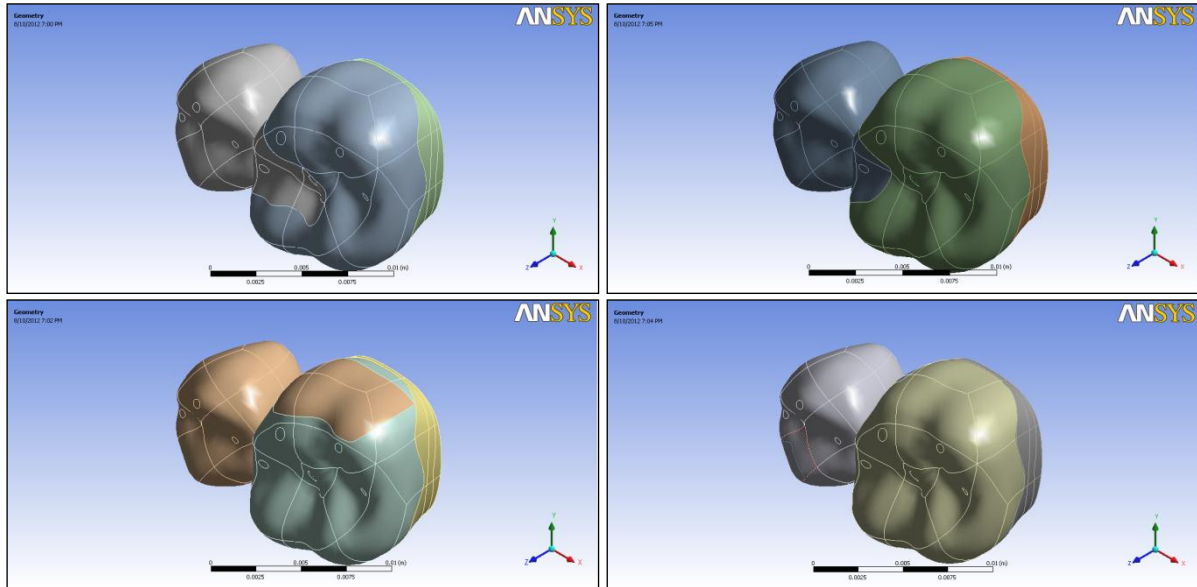


Fig. 1 The tridimensional models of the abutment preparations and the CFPDs exported in the ANSYS FEA software

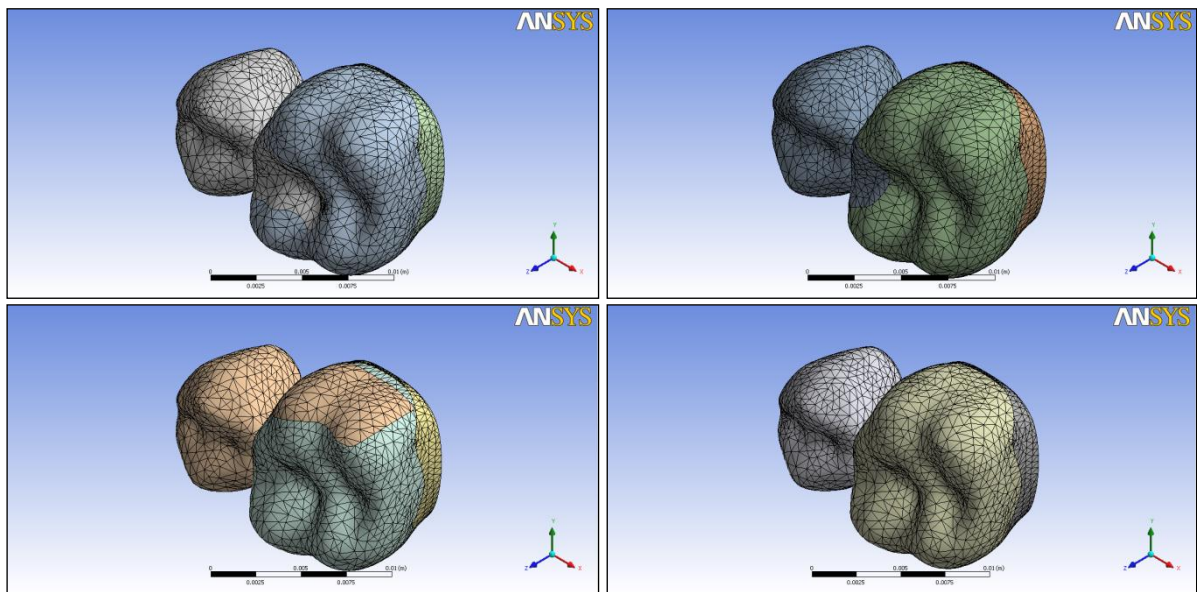


Fig. 2 Tridimensional meshing of the models - Occluso-proximal inlay preparation (1), Proximal box preparation (2), Palatal inlay with wings preparation (3), Palatal inlay preparation (4).

The tooth tissues (enamel, dentin) and the core materials (zirconia, pressed ceramic) were considered homogeneous and isotropic, possessing linear elasticity [10, 11, 12]. The characteristics of the materials and also of the tooth tissues (Young's modulus - E , Poisson's

ratio - μ) were introduced into the computer program - table I. The retainer-abutment interfaces were tied, simulating bonding [10, 11, 12]. The abutments were fixed on a horizontal plane, apically from the cement-enamel junction.

A loading of 200N per tooth was performed on the occlusal contact areas, corresponding to maximum intercuspation force on the mandibular molars [11]. The application of the occlusal forces respected a specific pattern, corresponding to maximum

intercuspation. (fig. 3) Analysis of the tridimensional models was conducted. von Mises stresses and total deformation were calculated in the tested restorations, in the abutment tooth tissues and also at the interface.

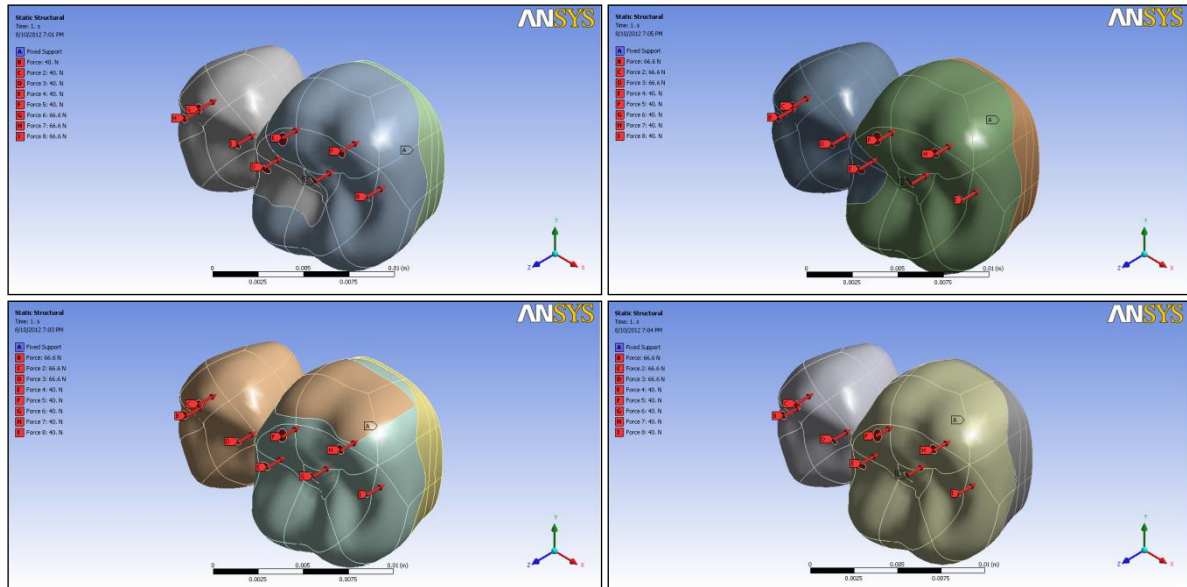


Fig. 3 Application of the occlusal forces –static load force of 200N/tooth

Table I. Material properties.

Material	Young's modulus of elasticity (MPa)	Poisson's ratio
Enamel*	84.1	0.20
Dentin*	18.6	0.31
Zirconia*	205	0.31
Emax Press**	91	0.23

[*12, ** 13]

RESULTS

The results are illustrated in the figures 4, 5, 6, 4', 5', and 6' and presented in table II and table III.

Table II. von Mises stress and the total deformation of the zirconia CFPDs.

	1. Occluso-proximal inlay	2. Proximal box	3. Palatal inlay with wings	4. Palatal inlay
von Mises stress in the CFPDs	630MPa	647MPa	486MPa	525MPa
von Mises stress at the interface	141MPa	163MPa	269MPa	362MPa
Total deformation	4.58µm	4.96µm	5.35µm	5.21µm

Table III. Von Mises stress and the total deformation of the pressed ceramic CFPDs.

	1. Occluso-proximal inlay	2. Proximal box	3. Palatal inlay with wings	4. Palatal inlay
<i>von Mises stress in the CFPDs</i>	626MPa	638MPa	492MPa	585MPa
<i>von Mises stress at the interface</i>	125MPa	133MPa	264MPa	355MPa
<i>Total deformation</i>	5.04μm	5.19μm	5.83μm	5.59μm

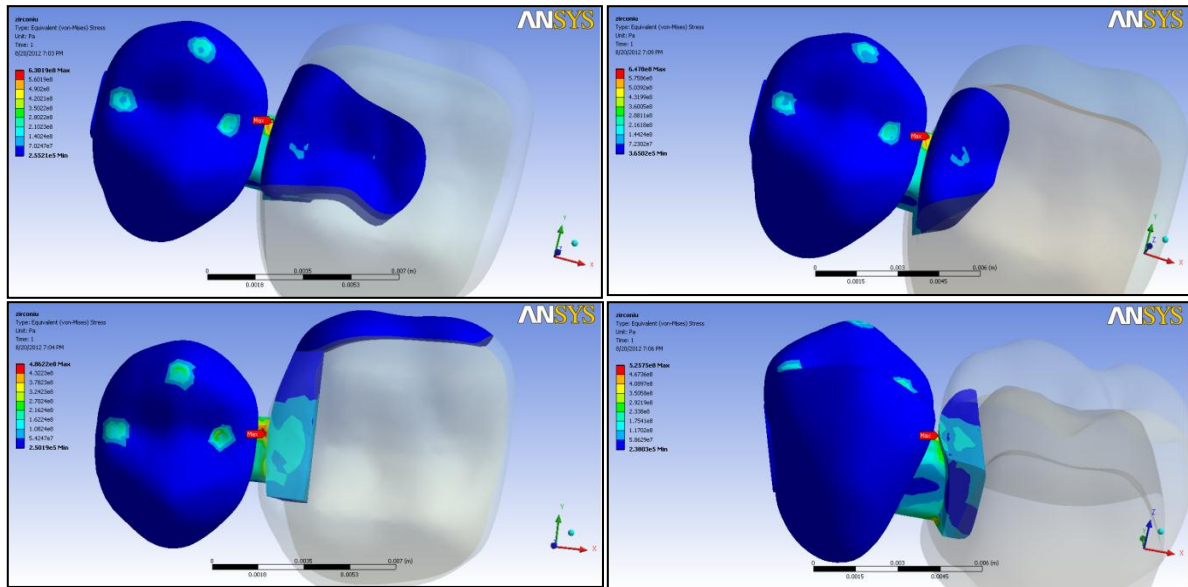


Fig. 4 Distribution of von Mises stress in the zirconia CFPDs – Occluso-proximal inlay preparation (1), Proximal box preparation (2), Palatal inlay with wings preparation (3), Palatal inlay preparation (4)

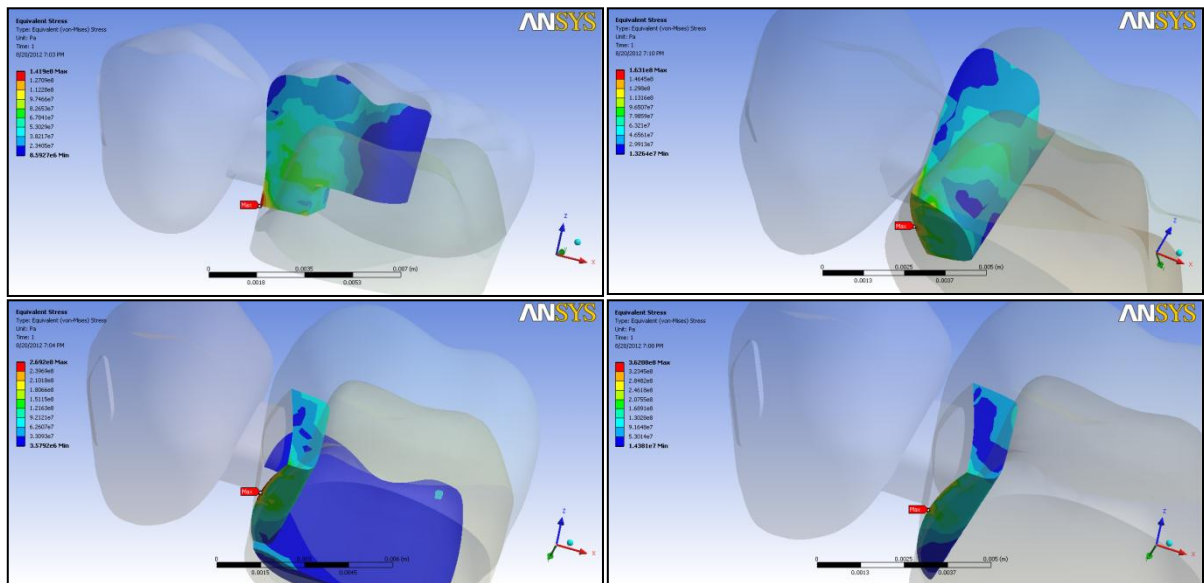


Fig. 5 Distribution of von Mises stress at the interface for the zirconia CFPDs

FEA revealed different stress concentration zones in the connector and the surrounding areas. Von Mises stress and total deformation were calculated. Von Mises stress is an

indicator that defines stress as an expression of the whole stress field, indicating the possibility of damage occurrence.

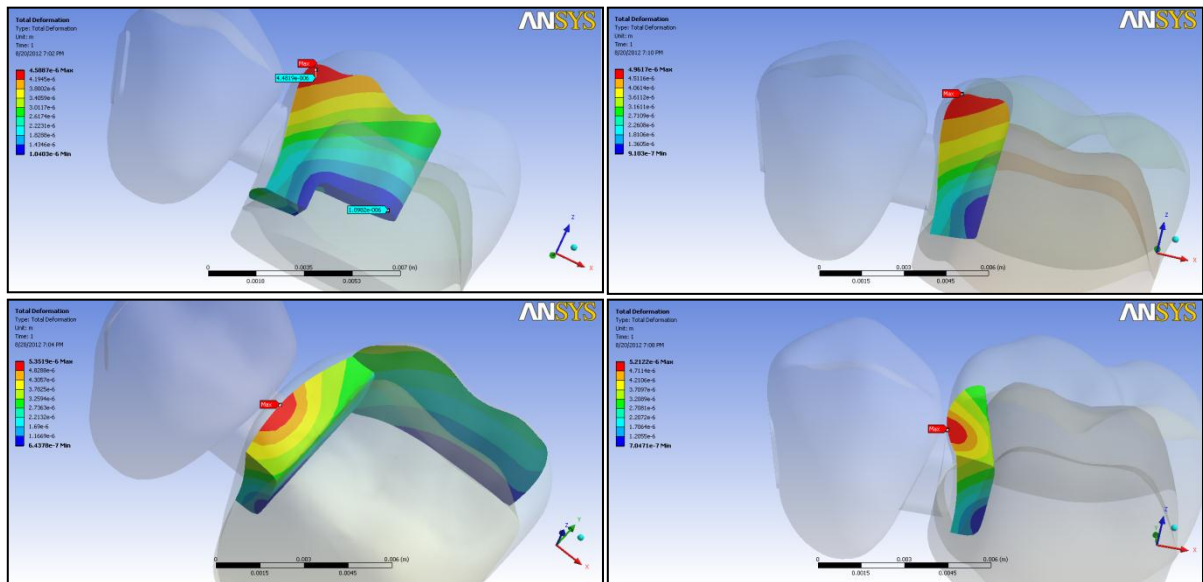


Fig. 6 Total deformation at the interface for the zirconia CFPDs

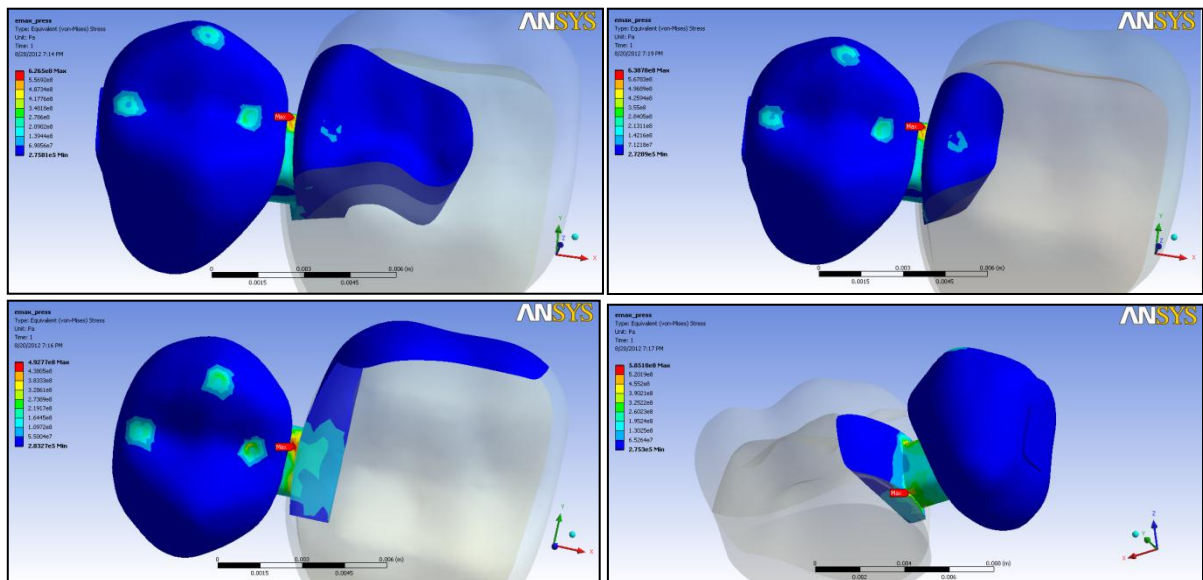


Fig. 4' Distribution of von Mises stress in the pressed ceramic CFPDs – Occluso-proximal inlay preparation (1), Proximal box preparation (2), Palatal inlay with wings preparation (3), Palatal inlay preparation (4)

Stress values ranged from 486MPa to 647MPa for zirconia and from 492MPa to 638MPa for pressed ceramic, in the tested restorations, with the highest von Mises stress for the proximal box preparation of the abutment. The palatal inlay with wings preparation presented the lowest von Mises stress values. Stress values at the interface ranged from 141MPa to

362MPa for zirconia and from 125MPa to 355MPa for pressed ceramic. The occluso-proximal inlay preparation displayed the lowest von Mises stress at the interface. Total deformation ranged from 4.58 μ m to 5.35 μ m for zirconia and 5.04 μ m to 5.83 μ m for pressed ceramic, with the lowest values for the occluso-proximal inlay preparation design.

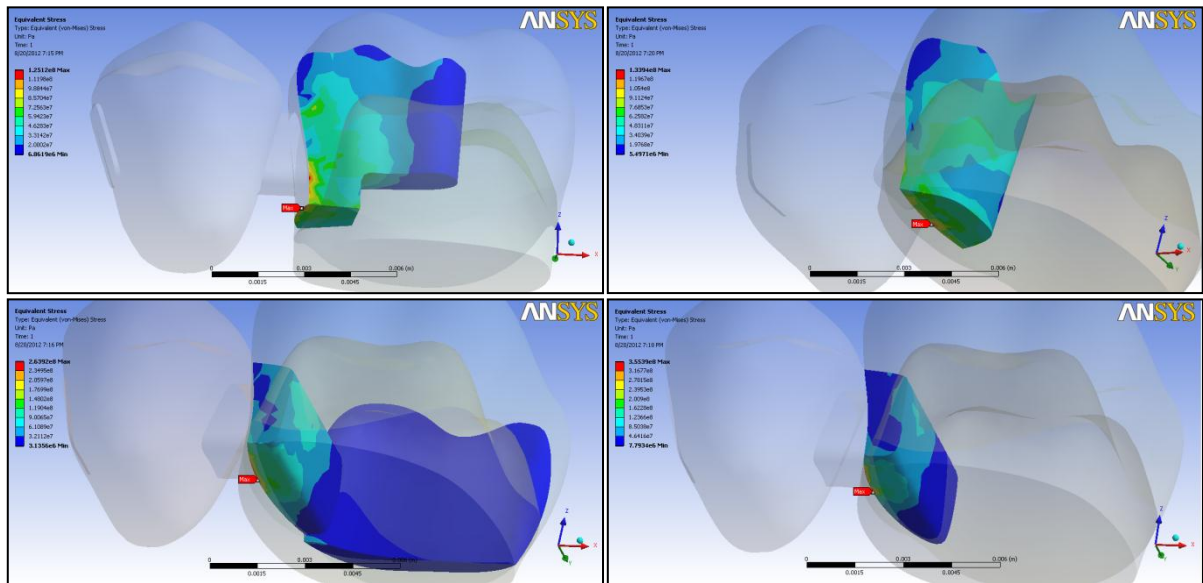


Fig. 5' Distribution of von Mises stress at the interface for the pressed ceramic CFPDs

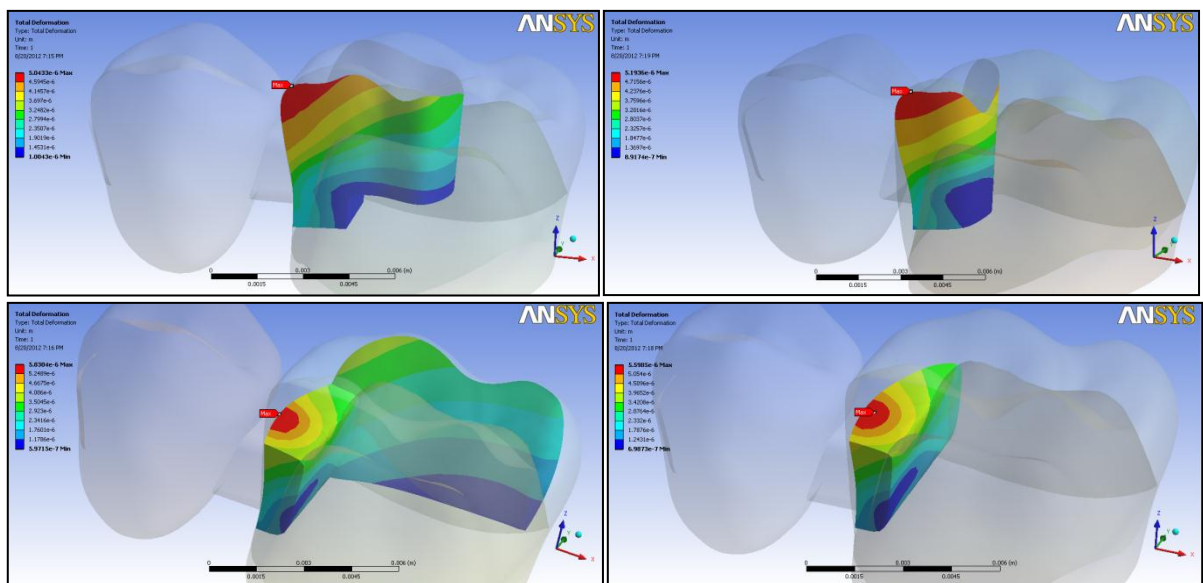


Fig. 6' Total deformation at the interface for the pressed ceramic CFPDs

DISCUSSIONS

The four situations displayed higher stresses on the occlusal aspect of the connector. The stress values and also the total deformation values were similar for the two tested ceramic materials.

The palatal inlay with wings preparation presented the lowest von Mises stress values in the restoration, but displayed relatively higher stress and total deformation at the interface. On the contrary, the occluso-proximal inlay preparation displayed higher von Mises stress in the restoration, but presented the lowest stress and total deformation at the interface.

The total deformation values were similar for the palatal inlay preparations when compared to the

occlusal-cervical preparations. The values of von Mises stress were much beneath 900-1200MPa (fracture strength of zirconia) [11]. Pressed ceramic CFPDs need to be further investigated to optimize the connector's geometry and size, in order of attaining better stress distribution.

Despite this study's limitations (no alveolar support and no periodontal ligament), it appears that all ceramic two-unit partial retainer CFPDs could be a viable treatment option when case selection is adequate. The great advantage of this kind of treatment is that it preserves relatively intact abutments until better adhesive techniques are developed. [6]

CONCLUSIONS

All-ceramic partial retainer two-unit CFPDs provide a viable alternative to their two retainer counterparts in the anterior region and also in the premolar region of the dental arch, when implant therapy is not possible nor indicated. In cases of replacing one missing tooth in the anterior or premolar region of the dental arch using all-ceramic partial retainer two-

unit CFPDs, both aesthetics and function can be successfully restored. The use of all-ceramic partial retainer two-unit CFPDs is a patient-friendly treatment, with a whole lot more advantages than disadvantages, being a relatively inexpensive therapeutic alternative and intelligently reducing tooth tissue damage.

ACKNOWLEDGEMENTS

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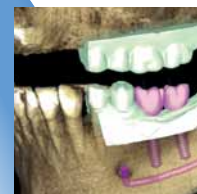
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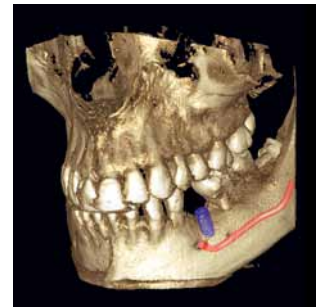
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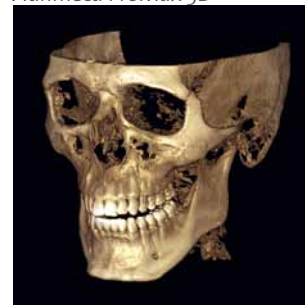


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For the journal „*Medicine in evolution*“, the manuscript must be typed double spaced, on white A₄ paper – 210 x 297mm, on one side (2.5cm upper and lower borders, 3cm left and 2cm right border, respectively), in clear characters, no further corrections or addings. It is advisable that articles are presented on CD or other data transfer methods, in Word format, 12 Times New Roman fonts - using Romanian characters – respecting the same page order, accompanied by a printed version. Graphs – black and white or coloured – may be generated in MS Excel or MS Graph, inserted in the body of the paper or presented in a different file. Infected materials will not be used.

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6.2. ABSTARCT OF THE PAPER

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Original studies must include a structured abstarct of maximum 150 words, containing the following titles and informations:

- Aim and objectives;
- Material and methods;
- Results;
- Conclusions;
- Key words: give 3-5 key words;
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The text will usually be divided into sections:

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- Material and methods – Describe the selection of observations or subjects for the experiment (including controls). Identify methods, equipments (with the name and address of the manufacturer in brackets) and give sufficient details on procedures. Give references for the selected methods, including statistical methods; offer details and brief descriptions for previously published methods which are not well known; describe new or substantially modified methods, justify their use and assess their limitations. Precisely identify all used drugs and chemicals, including generic names, dosage and administration ways. Describe statistical methods with sufficient details for reported results to be verified. Whenever possible, quantify discovered aspects and present them with appropriate measurement indicators for the uncertainty or error of measurement (such as confidence intervals).
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- Discussions – Underline new, important aspects of the study. Do not repeat in detail data which have been presented in previous sections. Include implications of revealed aspects and their limitations, including implications for future studies. Connect your observations to other relevant studies. Relate the results to the aim proposed for the study.
- Conclusions – organize conclusions which emerge from the study. In the end state: a) contributions to be acknowledged but which do not justify paternity right; b) thanks for technical support; c) thanks for financial or material support.

6.3.2 Indications for case reports

Themes may be selected from all medical fields. Manuscripts which offer a special gain for daily activity will have priority. The title must be clearly, precisely stated. It may be completed by a subtitle. It is advisable to include in the key words of the title the main message, the special element which may be observed from the case evolution. The content of a case report must be divided into three parts:

- Introduction – It must include a maximum of 15 typed rows (half page). Here, the main medical problem is summarized in order to place the case in a specific domain.
- Case report – It contains essential specific information on the case.
- In order to make a logical, chronological and didactical case report the following 5 chapters are needed:
 - I. Anamnesis;
 - II. Clinical examination data;
 - III. Laboratory data;
 - IV. Additional paraclinical investigations;
 - V. Treatment and evolution.
- Discussions – The reason for the case report must be stated. The report must be patient-centered. Occasional deviations from typical (characteristic) evolutions, nosologically important facts must be presented in such a manner to expose the clinical picture as completely as

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All measurements must be expressed in International System (IS) units. Abbreviations must be fully explained when first used.

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Include explanations for each used symbol, etc. Identify the printing method for microphotographs.

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