

Medicine in Evolution



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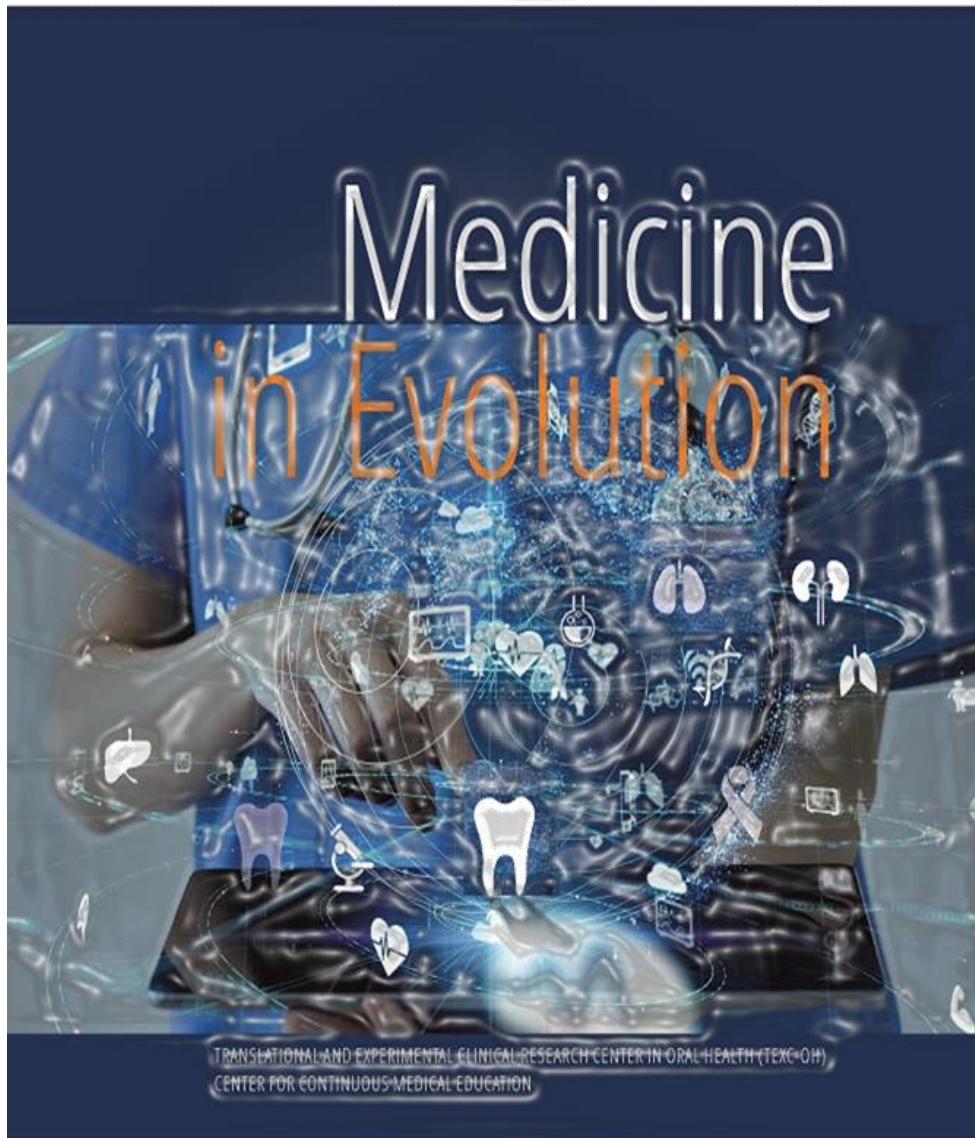
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MEDICINE IN EVOLUTION



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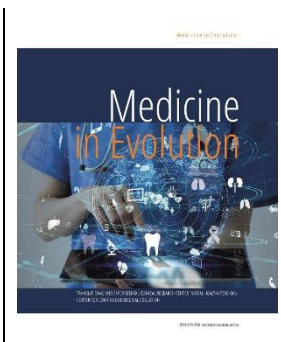
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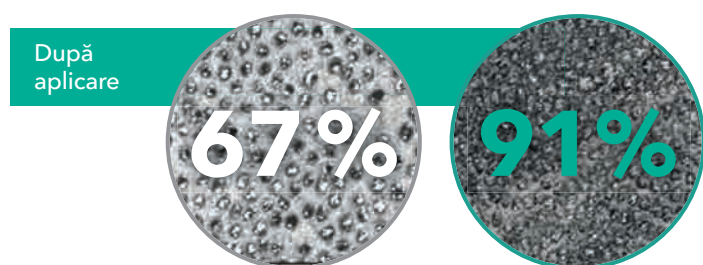
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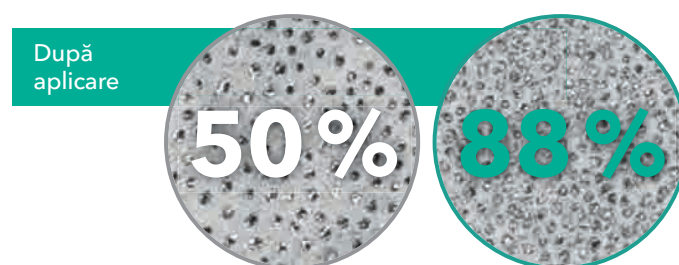
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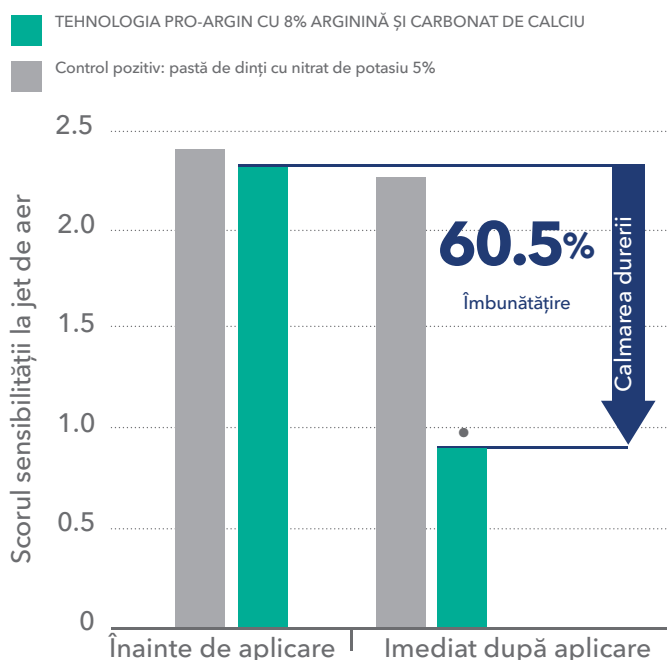
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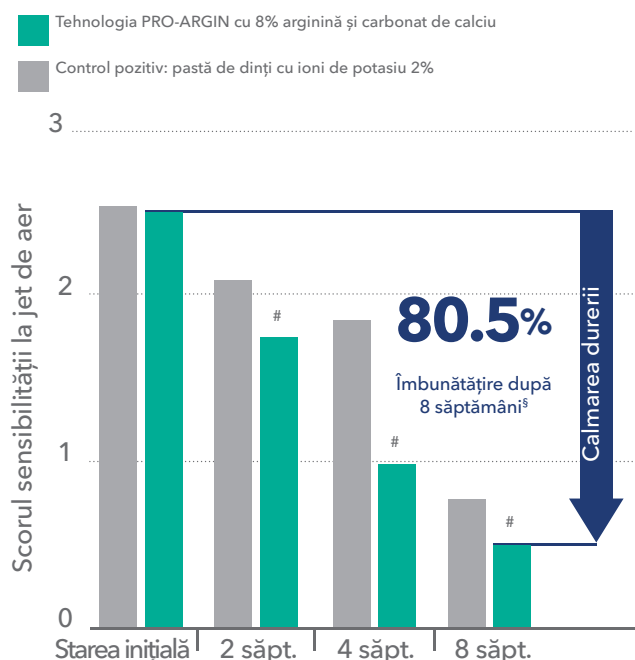
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† În comparație cu starea inițială (sunt prezentate doar datele relevante)
• Semnificativ statistic ($p < 0,001$)

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



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

*Studiu in vitro, imagini reale de microscopie confocală după 5 aplicări ($p < 0,05$);
**Pentru calmarea imediată aplicați direct pe suprafața sensibilă și masați ușor cu vârful degetului timp de 1 minut.
Referințe: 1. Hines D, et al. Poster acceptat, July 2018 IADR. Colgate- Palmolive Company 2018.; 2. Hines D, et al. Poster #0742, March 2018 AADR. Colgate-Palmolive Company 2018.; 3. Nathoo S, et al. J Clin Dent. 2009;20(Spec Iss):123-130;
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IN MEMORIAM

Prof. Univ. Dr. DORIN BRATU



Prof. Univ. Dr. Dorin Bratu, a leader in the field of dentistry, left us, passing into another dimension on April 12, 2021.

Outstanding personality, with an extremely great contribution in raising the quality of the medical act in dentistry to the rank of an elite medical branch, he passed away, leaving an impressive legacy both professionally and didactically as well as in research.

He has mentored many generations of students to whom, with didactic grace and passion, he has opened the desire to surpass themselves as doctors, to professionally dedicate themselves to patients and to increase their quality of life through the implemented therapies. He instilled in them a passion for research and improvement.

Being a good speaker, pedagogue and possessing didactic grace, he managed to form collaborators who were motivated by the desire to follow in his footsteps.

By participating in a series of national and international scientific events, he managed to disseminate the fruits of individual and team research. The numerous books and articles published are still the basis for the professional training of both students and specialists.

International recognition has made it easier for him to access many projects and open new horizons for his entire team.

At national level, he managed to bring the Faculty of Dentistry in Timisoara to the highest level.

He lived in harmony and good peace with his beloved family. He instilled in family members the desire for perfection, gave them warmth, wise counsel and love. He protected and stimulated them both emotionally and professionally.

Prof. Dr. Dorin Bratu remains a standard for academics, dentists and researchers in the medical field. Belief, tenacity, devotion to the profession remain as guidelines for future generations.

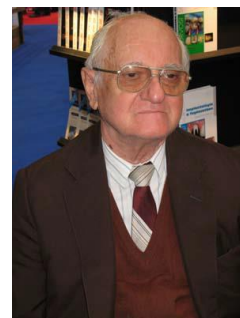
The editorial staff of the journal *Medicine in evolution* regretting the disappearance of Prof. Univ. Dr. Dorin Bratu deplores the passing away and the huge emptiness caused by it.

We will never forget you!

Editor in Chief,
Angela Codruta Podariu

IN MEMORIAM

Prof. Univ. Dr. BOCSKAY ȘTEFAN



RECQUIESCAT IN PACE

We sadly announce that a highly respected professor, an exceptional physician, a valuable man elegantly left leaving behind the image of a true educator:

Prof. Dr. Bocskay Ștefan

Condoleances to the grieving family.

Dentists College-Mureș

He obtained the dentist degree at the UMP Cluj in 1954. His activity took place in the District Hospital Târgu Mureș where he worked as specialist and then senior in dentistry until 1960 when he was invited to become university assistant in the Department of Odontology – Periodontology by Prof. Dr. Ludovic Csögör, the Rector of the Faculty of Dentistry in Târgu Mureș. After going through all the hierarchical steps, in 1978 he becomes university professor.

He was also involved in the organisation of the didactic process. Three times he was Dean of the Faculty of Dentistry between: 1972-1973, 1984-1986, 1989- 1990, and between 1986-1989 he acted as Provost of the three medical faculties: General Medicine, Dentistry and Pharmacy. He describes these years in an interview recorded by the local paper in Sighetul Marmăției in November 12, 2015: In 1984 I was elected as Dean. Once, the „deceased” decided that the Faculty of Dentistry in Târgu-Mureș to be transformed in a School of 3 years for Dentists. I sent a statement explaining that 3 years are not sufficient to acquire this speciality. As a consequence I was dismissed from the position of Dean because I had the courage to speak against the decision of the Party. Some days and nights followed which I hope nobody will ever experience! Through the years I still managed to become a professor in the faculty and I enjoyed training young people in the chosen speciality.

It must be noted that many professors in the Universities of Dental Medicine in our country finalised their doctoral thesis with the aid of histopathology slides of hard dental tissues prepared in the only acknowledged laboratory at UMP Târgu Mureș organised by the esteemed professor. Today, this collection includes thousands of histologic pieces which are carefully protected in the museum of the Faculty as unique items in the world of specialists.

In 2011, for the lifetime work in the field of medical science, University Professor Dr. Ștefan Bocskay received the most valuable academic title - Doctor Honoris Causa, - from the senate of the Semmelweis University of Medicine and Pharmacy in Budapest.



We are very sad to learn that Emeritus Dr. Ștefan Bocskay passed away. Dental medicine in our country loses one of the most valuable professors who dedicated his life to research, didactic work as well as to the organisation of dentistry teaching in Romania.

In the name of the Faculty of Dental Medicine of the "Victor Babeș" University of Medicine and Pharmacy I express condolences to the grieving family, to the institution he served with devotion, as well as to all those who respected him. May God rest him in peace!

Prof. Dr. Habil. Meda-Lavinia Negruțiu, DMD, PhD
Dean of the Faculty of Dental Medicine
University of Medicine and Pharmacy "Victor Babeș" Timisoara.

In the name of colleagues, students and all those who knew him, the collective of the journal *Medicine in evolution* in Timișoara expresses condolences. May he forever rest in peace!

Pilot study on antibiotic resistance of conjunctival bacteria - RAGS study



**Popa-Cherecheanu M.^{1,2}, Ionescu D.^{3,4}, Grigore R.^{1,5}, Munteanu G.S.^{1,7},
Simion-Antonie C.B.¹, Bejenaru P.L.¹, Berteșteanu Ș.V.^{1,5}, Ionescu T.P.³,
Deleanu D.G.⁶, Popa-Cherecheanu A.^{1,6}**

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Abstract

The main purpose of this study is to compare the resistance profile of bacteria isolated from conjunctival secretions in our center with that of bacteria isolated in the ARMOR 2013 study. A total of 1591 samples were analyzed, successively collected for 5 years. Of these, 53.5% had a positive result, 37.6% were negative, and 8.9% were contaminated with saprophytic flora, the latter not being included in the statistics. The resistance of *Staphylococcus aureus* MRSA / MSSA to clindamycin, chloramphenicol and ciprofloxacin obtained in the RAGS study is higher than that recorded in the ARMOR study. The resistance of coagulase-negative staphylococci (MR CoNS / MS CoNS) to tobramycin obtained in our study is higher than that recorded in the ARMOR study, the same being true for chloramphenicol. The resistance of *Pseudomonas aeruginosa* to tobramycin obtained in the RAGS study is also higher than that recorded in the ARMOR study.

Keywords: antibiotic resistance, conjunctival secretion, ocular antibiotics

INTRODUCTION

The bacterial resistance profile to antibiotics may vary depending on the geographical location (Olson et al. 2010), so the antibiotic therapy schemes in the guidelines are not always fully applicable in all regions and there may be variations from one country to another, or even between centers. Therefore, it is important to know the local particularities so that the treatment can be adapted accordingly, both to achieve the best possible therapeutic success for the patient, but also to combat possible new resistance to antibiotics.

Aim and objectives

The main purpose of this study is to compare the resistance profile of bacteria isolated from conjunctival secretions in our center with that of bacteria isolated in other studies, conducted mainly in the United States (Hsu et al. 2015). The study with which we set out to compare our results is ARMOR 2013.

The ARMOR study (Antibiotic Resistance Monitoring in Ocular Microorganisms) is a program developed to monitor ocular pathogens in the United States. The initial results of the ARMOR study based on isolates collected from 34 institutions during 2009 and were published in 2011 (ARMOR 2009), and data between 2009-2013 (ARMOR 2013) were published in 2017. The ARMOR study extends the data collected in a wide range of studies (TRUST study) by additional analysis of *Pseudomonas aeruginosa* and *coagulase-negative staphylococci* (CoNS). The ARMOR 2013 study analyzed a total of 3237 isolates, representing the largest study of its kind (Haas et al. 2009, Asbell et al. 2008, Dar et al. 2016).

MATERIAL AND METHODS

The study is descriptive, observational, transversal, conducted within the Department of Ophthalmology of the University Emergency Hospital Bucharest. The data were extracted using the informatic system Infoword Hospital and then centralized in Microsoft Excel, the statistical analysis being performed in SPSS and the statistical computer <https://www.socscistatistics.com/tests/> for the chi-square calculation.

The study included all samples of conjunctival secretions collected between 2014 and 2018. Based on the pathological product harvested at the conjunctival level, bacterial cultures were performed and the susceptibility to different antibiotics was tested, focusing on the resistance of certain categories of germs and on certain antibiotics, analyzed in the ARMOR 2013 study as well.

We named this pilot study **RAGS** (Resistance to Antibiotics of Germs in conjunctival Secretions).

RESULTS AND DISCUSSIONS

A total number of 1591 consecutive samples from different patients, collected between 2014-2018 were analyzed. Of the 1591 bacterial cultures, 851 of them (53.5%) had a positive result, 599 (37.6%) were negative, while 141 (8.9%) were contaminated with saprophytic flora. Contaminated samples were not included in the subsequent statistical analyzes.

Only bacteria isolated from positive cultures were analyzed (see Table 1).

Table 1. Distribution of bacteria isolated from conjunctival secretions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<i>Bacillus spp.</i>	1	.1	.1	.4
	<i>Enterobacter spp.</i>	8	.9	.9	1.3

<i>Enterococcus faecalis</i>	1	.1	.1	1.4
<i>Escherichia coli</i>	10	1.2	1.2	2.6
<i>Klebsiella spp.</i>	31	3.6	3.6	6.2
MR CoNS	93	10.9	10.9	17.2
MRSA	180	21.2	21.2	38.3
MS CoNS	121	14.2	14.2	52.5
MSSA	348	40.9	40.9	93.4
<i>Proteus spp.</i>	9	1.1	1.1	94.5
<i>Pseudomonas aeruginosa</i>	45	5.3	5.3	99.8
<i>Serratia spp.</i>	1	.1	.1	99.9
<i>Streptococcus spp.</i>	1	.1	.1	100.0
Total	851	100.0	100.0	

The following bacteria were isolated in the positive cultures: *Bacillus spp.*, *Enterobacter spp.*, *Enterococcus faecalis*, *Escherichia coli*, *Klebsiella spp.*, *Proteus spp.*, *Pseudomonas aeruginosa*, *Serratia spp.*, *Staphylococcus spp.*, *Streptococcus spp.*

Staphylococci were subsequently divided into *Staphylococcus aureus* (methicillin-sensitive MSSA / methicillin-resistant MRSA) and coagulase-negative staphylococci (as well as methicillin-sensitive MS CoNS / methicillin-resistant MR CoNS).

The bacteria marked in bold in Table 1 are of special interest, as they are part of the set of bacteria analyzed in the ARMOR study and we aim to compare the results of RAGS study with the results of ARMOR study.

We will analyze the resistance of the studied bacteria (R=resistant) to different antibiotics and we will compare the differences between the results of RAGS and ARMOR studies (statistical significance).

Table 2. Resistance of methicillin-sensitive *Staphylococcus aureus* to various antibiotics in RAGS and ARMOR studies

MSSA	Susceptibility	Ciprofloxacin	Tobramycin	Clindamycin	Cloramfenicol
RAGS	R	20.1%	10%	29.6%	18.4%
ARMOR	R	13.3%	4%	6.5%	0.2%
p-value		.008045	.000203	<0.000001	<0.000001

Table 2 illustrates the resistance of MSSA to various antibiotics. There are still large differences in resistance rates compared to those reported in the ARMOR study; for all antibiotics (ciprofloxacin, tobramycin, clindamycin, chloramphenicol) the difference is statistically significant and very high compared for last two.

Regarding MRSA resistance to the same antibiotics, in the RAGS study the resistance to clindamycin and chloramphenicol was statistically significant higher than in the ARMOR study. In the ARMOR study the resistance to chloramphenicol was almost absent (0.7%). Interestingly, the ARMOR study reports a higher percentage of ciprofloxacin resistance (76.1%) compared to 59.9% in the RAGS study (Table 3).

Table 3 Resistance of methicillin-resistant *Staphylococcus aureus* to various antibiotics in RAGS and ARMOR studies

MRSA	Susceptibility	Ciprofloxacin	Tobramycin	Clindamycin	Cloramfenicol
RAGS	R	59.9%	49.7%	69.2%	40.1%
ARMOR	R	76.1%	40.6%	30.8%	0.7%
p-value		.000034		.000048	<0.00001

Table 4. Resistance of methicillin-sensitive coagulase-negative staphylococci to various antibiotics in RAGS and ARMOR studies

MS CoNS	Susceptibility	Ciprofloxacin	Tobramycin	Clindamicin	Cloramfenicol
RAGS	R	13.3%	26.3%	6.9%	11.1%
ARMOR	R	14.4%	2%	7.2%	0.5%
p-value			< 0.00001		< 0.00001

The resistance of MS CoNS to tobramycin and chloramphenicol is very high in the RAGS study compared to the ARMOR study (26.3% compared to 2% respectively 11.1% compared to 0.5%), the differences being statistically significant. It is hypothesized that staphylococcal resistance to methicillin also causes a higher expression of other resistance to antibiotics.

In table 5 we compare MR CoNS resistance to the same antibiotics, highlighting much higher levels of MR CoNS resistance to chloramphenicol and tobramycin ($p < 0.00001$) in the RAGS study.

Tobramycin resistance of *Pseudomonas aeruginosa* was statistically significantly higher in the RAGS study compared to resistance reported in the ARMOR study (Table 6).

Table 5. Resistance of methicillin-resistant coagulase-negative staphylococci to various antibiotics in RAGS and ARMOR studies

MR CoNS	Susceptibility	Ciprofloxacin	Tobramycin	Clindamicin	Cloramfenicol
RAGS	R	54.8%	68.3%	32.1%	36.4%
ARMOR	R	54.6%	14.4%	31.4%	1.2%
p-value			< 0.00001		< 0.00001

Table 6. *Pseudomonas aeruginosa* resistance to various antibiotics in RAGS and ARMOR studies

<i>Pseudomonas aeruginosa</i>	Susceptibility	Ciprofloxacin	Tobramycin
RAGS	R	4.7%	39.5%
ARMOR	R	5.1%	3.1%
p-value			< 0.00001

CONCLUSIONS

Staphylococcus aureus (MRSA / MSSA) resistance to clindamycin, chloramphenicol and ciprofloxacin obtained in the RAGS study is higher than in the ARMOR study. MSSA was susceptible to tobramycin, but not MRSA.

The resistance of coagulase-negative staphylococci (MR CoNS / MS CoNS) to tobramycin obtained in our study is higher than that recorded in the ARMOR study, the same being true for chloramphenicol as well.

The resistance of *Pseudomonas aeruginosa* to tobramycin obtained in the RAGS study is also higher than that recorded in the ARMOR study.

These results raise issues related to the therapeutic arsenal actually available for the treatment of superficial and deep eye infections because these two antibiotics (tobramycin and chloramphenicol) are the most prescribed eye drops, but it also seems to have developed the highest resistance.

The study has, of course, some limitations related to antibiotic testing of samples obtained from conjunctival secretions, which are not tested in a standardized way on the same set of antibiotics, but most probably with those available in each moment.

However, the results of the study are strong enough regarding increased antibiotic resistance in the context of the overuse of antibiotics in ophthalmic practice.

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Methods of isolation and identification of Enterobacteriaceae



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Abstract

Aim and objectives: The purpose of this study on the isolation and identification of Enterobacteriaceae is aimed at bacteriological examination, following the basic examination of the microbiological diagnosis of pathological samples, being represented by the cultivation of feces on specific culture media.

Methods: We conducted a prospective and retrospective study on eighty-six isolated clinical trials, including Enterobacteriaceae, to identify and highlight genotypic and/or phenotypic characteristics between strains isolated from single infections and those isolated from recurrent cases based on microbiological diagnosis registered in the bacteriological register of the medical analysis laboratory, SC Diaser, Oradea.

Results: Antibodies detected by the Western blot method are guided against the 3 species of Yersinia: enterocolitica, pseudotuberculosis and pestis. For the detection of specific anti-Yersinia antibodies, the antigen-loaded band is incubated together with the patient's diluted serum. The weakly selective media, MacConkey, Eosin-Methylene Blue, allow the growth of all Enterobacteriaceae lactase positive and negative, even other groups of gram-positive bacilli.

Conclusions: Poorly selective media, MacConkey, Eosin methylene blue, allow the growth of all Enterobacteriaceae lactase positive and negative, even other groups of gram-positive bacilli.

Keywords: Enterobacteriaceae, gram negative, anaerobe, pathogen agents

INTRODUCTION

The habitat for Enterobacteriaceae is the intestinal flora and it is one of the most frequent human pathogen agents [1,2]. Also they are the source of infections achieved in the community and in the hospitals. They have the tendency to spread easily among the people by the transport of food, contaminated water and to achieve genetic material by horizontal transfer of genes, mediated in the greatest part by plasmids and transposons.

For the fast differentiation, although the test of catalase was used for many years, of types of gram-positive microorganisms, it was told very little about its utilization for Enterobacteriaceae [3]. It was found the fact that, there is a great variety of methods for the accomplishing of the test of catalase that there is no universally accepted concentration for the hydrogen peroxide and that there were no gradations mentioned for the strength and speed of the reaction.

It was observed that *Serratia*, *Proteus* and *Providencia* are strong reactors of catalase [4-6]. In exchange, *Salmonella* and rarely isolated *Escherichia*, *Enterobacter* și *Klebsiella* were moderated catalase reactors. In great part, the strains of *Escherichia* and *Shigella* have nonreactive, while the majority of *Enterobacter* strains had the tendency to be weakly reactive. The *Klebsiella* strains were divided equally between non-reactive and weakly reactive [7-9].

A special role is also the association of more characteristic activities and namely, the fermentation of sugar, the split up of amino acids or other compounds, respectively the production of hydrogen sulphide together with the adequate indicators.

Another group if that of selective components that inhibits the associated flora allowing the development of enteric pathogens. There were proposed and are used selective agents or groups of agents of inhibitory capacity and of enteric bacteria, that have to be isolated [10].

In the last years there was a category of different selective mediums that was extended very much using antibiotics and sulphonamides as pressing factors. The advantages to dose with precision the quantities in relation to the associated flora and the more reduced price are taken into consideration in the promoting of these mediums.

Aim and objectives

The purpose of this study regarding the isolation and identification of the Enterobacteriaceae has as target the bacteriological examination, following the basic examination of the microbiological diagnosis of the pathological samples, being represented by the cultivation of the fecal matters on specific mediums of culture.

This presupposes the isolation of the bacterial etiologic agent on adequate mediums and its identification based on the morphological characteristics, of culture, exoenzymatic and antigenic, of biochemical reactions, respectively.

Objectives: Isolation without enriching or direct isolation; Identification corresponding to each methodology of investigation; Prominence of the utilization of mediums of enriching for the isolation of the aerobe enteritis pathogens.

MATERIAL AND METHODS

We accomplished a prospective and retrospective study, on eighty-six clinical isolated samples including Enterobacteriaceae to identify and underline the genotypic and/or phenotypic characteristics between the isolated strains from cases of unique infection and those isolated from recurrent cases based on the microbiologic diagnosis registered in the bacteriological register of the laboratory of medical analysis, S.C. Diaser, Oradea.

Necessary materials for the performing of the examination: A recipient of collection (collection recipient of fecal matter with collecting spoon) with transport medium; Wood spatula; Latex gloves.

For the collection of fecal matter it has to be collected a sample of fecal matter of 5-10g introduced in the collection recipient of fecal matter with transport medium. If the stool is liquid, it will be collected 5 ml. It is recommended to be chosen a liquid, mucous and bloody portion, if there is one. Don't collect quantities larger than 10g because will reduce the chances of isolating the pathogen bacteria.

In regard to the collection, it has to be done as close to the beginning of the disease as possible and before the instauration of any antimicrobial treatment.

The collection from the stool spontaneous emitted – is preferred and is indicated in all the forms of acute diarrhea when the fecal matter emitting is frequent.

The investigation of the bearers of *Shigella* and *Salmonella*, with the exception of those of *S. Typhi*.

For this type of collection are used Nelaton probes (nr.14-16) or adequate tampons, as the following: with the tampon, moisten in isotone saline solution (not to be used lubricant gels), is penetrated the anal sphincter by slow rotation, being introduced intra-rectum approximately 15 cm. It will be proceeded identically also with the Nelaton probe, to which is adapted a syringe (10 ml) with which are made 1-2 aspirations. After the prelevation, the probes and tampons are introduced in sterile recipients that contain preservation medium, are labeled correspondently and are sent to the laboratory.

RESULTS

The antibodies detected by the Western blot method are guided against the 3 species of *Yersinia*: *enterocolitica*, *pseudotuberculosis* and *pestis*. The test uses secretory antigens coming from *Yersinia* serologically relevant, that are separated based on the molecular weight by the electrophoresis in gel of polyacrylamide in the presence of sodium dodecyl sulphate and transferred afterwards electrophoretic on a membrane of nitrocellulose. The free connection situses from the membrane are saturated with a solution of proteins, after which the matrix is washed and cut in strips. For the detection of the specific antibodies anti-*Yersinia* the strip loaded with antigens is incubated together with the diluted serum of the patient. If in the serum are present specific antibodies, they are connected to the corresponding antigens from the strip.

The mediums of enriching frequently used for the isolation of the aerobe enteritis pathogens from the groups *Salmonella*, *Yersinia*, *Vibrio* are presented in Table 1.

The medium of culture, broth, for *Salmonella* with sodium selenite acid in many variants, has the specificity the fact that the selenite with cysteine gave the best results for the isolation of the serotypes met equally in human (Figure 1).

Its capacity can be enriched and the period of incubation shortened 12-18 hours by incubation 40-41°C. When the possibilities don't allow by a single medium of enriching, the medium with selenite is preferred. It is inhibitor for other enterobacteria (especially lactose-positive), but *Proteus* and *Shigella* are developed relatively frequently.

Rappaport-Vasiliadis broth, also highlighted as having a good capacity of enriching, is recommended and mentioned with superior results for the enriching of all the other serotypes, with the exception of *Salmonella* serotype *Typhi*.

The medium of culture with tetrathionate broth was used for the isolation of *Salmonella* serotype *Typhi*. It is used in more restraint quantity due to the laborious preparation and the difficulties of sale as industrial product "ready to be used" or in dry form.

Table 1. The medium of enriching for the isolation of the aerobe enteritis pathogens

Medium	Inhibitors for associated flora	Temperature of incubation	Duration of incubation	Duration of incubation	Observations
			Salmonella	Yersinia	
Alkaline peptone water	Ph 9,0-9,2	35°C/37°C	—	—	—
Broth for gram-negative bacilli	Sodium deoxycholate	35°C/37°C 22°C	18-24 hours	18-24 hours	Allows also the multiplication of other gram-negative bacilli
Selenite broth sodium acid (Leifson)	Sodium selenite	35/40°C	18-24 hours	—	Shigella increases inconstantly, has multiple variants
Tetra-thionate broth	Biliary salts Brilliant green Iodine	35°C/37°C	18-24 hours	—	—
Rappaport broth	Malachite green	37°C	18-24 hours	—	—
Tampon phosphate solution	—	3-5°C	—	2-4 weeks	—

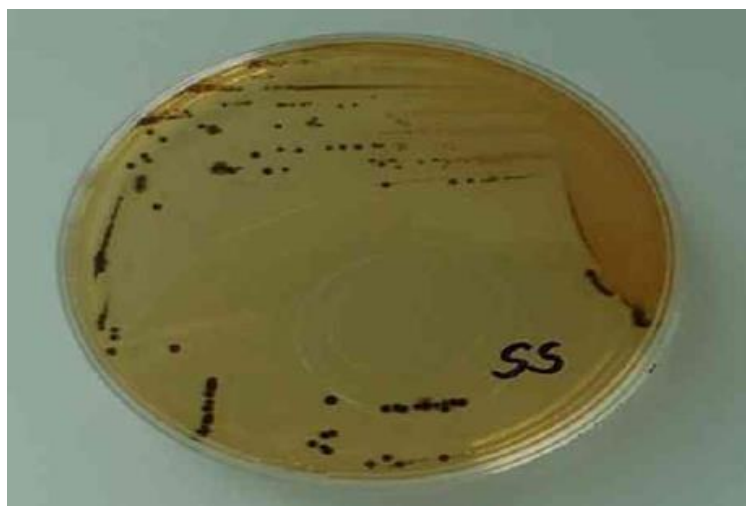


Figure 1. Salmonella colonies "cat eyes". Medium of culture SS

For Yersinia a current procedure of enriching is the keeping of the sample tampon in phosphate tampon solution 2-3 weeks at 4-5°C after which is seeded by selective media. Because the bacteria from the gender Yersinia are developed preferentially at 22-29°C, the simple incubation at this temperature accomplishes the enriching of the broth for gram-negative bacilli.

The inoculation of the media of enriching was performed by the suspension of fecal matters that is seeded with pipet: 7-10 drops for each tube with enriching medium (the maximum proportion 1/10). The tampons from sample were transferred directly on enriching media.

The incubation is performed at 35-37°C maximum 24 hours. The selenite broth is incubated at 40-41°C, but in this case the passing on selective media is made at 12-18 hours.

The isolation without enriching or the direct isolation consists of the seeding of the sample and the suspension of fecal matters is accomplished directly on selective media for the obtaining of characteristic isolated colonies, in order to identify them.

The selective media are always solid media (agar) that contain mainly three groups of constituents. Thus, there is a group of nutritive constituents that favor the bacterial growth (meat extract, peptone, yeast extract, factors of growth).

DISCUSSIONS

The coprocitogram usually indicates the presence of the erythrocytes and leucocytes is large number [11]. The test has a significance but there is a number of polymorphonuclear (PMN) greater than 10/hpf (microscopic field with large power – objective 40x). The most frequently involved are the germs from the group *Shigella*, *Salmonella*, *Campylobacter*, *Escherichia coli* enteroinvasive and enterohemorrhagic.

In regard to the pre-identification of the isolated samples, is accomplished by the 3rd phase of the bacteriologic diagnosis that will be approached [12,13]. The classification in genders and even in species is useful but the practical diagnosis and the further study, in the specialized laboratories and reference centers, of the isolated strains. This study starts from primary elements that characterize the isolate and namely, morphological aspects, aspects of cultivability and minimum data regarding the exoenzymatic behavior [14,15].

In a study on frozen beef pate, performed in USA, APC (aerobic plate count) was smaller than 3,0 $[\log]_{10}$ UFC/g, and coliform and *Escherichia coli* biotype I was under 1,0 $[\log]_{10}$ UFC/g. These researchers observed a lack of correlation between the small number of *E.coli* biotype I and *E.coli* O157:H7. A Canadian study showed that the number of coliform bacilli and *E.coli* recovered from the tables and from the transporting belt, in a unit of processing the meat was similar to the one recovered from the pieces of meat sectioned from the side margins, which underlined the importance of the devices as source of this microorganism for the parts of cut meat.

The efficiency of the medium of culture for *Salmonella-Shigella* is underlined in the study regarding the “Superiority of MacConkey Agar compared to *Salmonella-Shigella* Agar for the isolation of *Shigella dysenteriae* Type 1”.

The efficiency of MacConkey Agar in isolating different types of *Shigella* was compared with that of *Salmonella-Shigella* (SS) during an extended outbreak of disease of 18 months caused by *Shigella*. Totally there were 1580 isolated samples of *Shigella* from 12307 samples of rectal tampons and fecal matters from patients with diarrhea and their contacts by direct plating on MacConkey agars and SS. *Shigella dysenteriae* type I and *Shigella flexneri* were 55% and, respectively, 33% of all the isolated samples, with a smaller number of *Shigella boydii* and *Shigella sonnei*. MacConkey Agar was superior to the SS agar in detecting *S. dysenteriae* type I; 83% of the isolated samples were detectable on MacConkey Agar compared to 40% on SS agar. In exchange 84% of the isolated samples *S. flexneri* were detectable on agar SS, compared to 51% only on MacConkey Agar. This discovering confirm the fact that, for the culture of fecal test tubes about which is considered that *S.S. dysenteriae* type I, one of the media used, should be non-inhibiting.

CONCLUSIONS

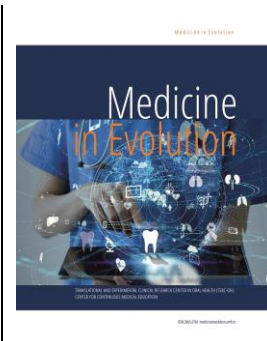
The weakly selective media, MacConkey (MC), Eosin methylene blue (EMB), allow the growth of all the Enterobacteriaceae lactase-positive and negative, even of other groups of gram-positive bacilli. The moderate selective media have a more selective capacity than the gram-negative bacilli. The media moderate selective have a higher selective capacity inhibiting considerably the lactase-positive Enterobacteriaceae.

The coprocitogram is a usual technique that establishes a presumptive diagnosis in the infectious diarrhea, as a consequence of the microscopic examination of the fecal matters, indicating usually the presence of erythrocytes and leucocytes in large number. The test has a significance if there is a larger number of polymorphonuclear (PMN) than 10/hpf.

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Premature infants with premature retinopathy in timisoara. Prevention and therapeutic conduct in Bega maternity



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Abstract

Premature retinopathy (ROP) is a vasoproliferative disease secondary to inadequate vascularization of the immature retina of premature infants, which can lead to blindness or severe visual sequelae. It is one of the leading causes of preventable child blindness, with about 2/3 of the 50,000 blind children worldwide living in Latin America. The proportion of blindness caused by ROP is greatly influenced by the level of neonatal care (availability, human resources, equipment, access and quality of care), as well as the existence of screening and treatment programs. Therefore, there is great variability in the occurrence of the disease in developed and developing countries [1-3]

Keywords: prematurity retinopathy, premature infants, intraventricular hemorrhage

INTRODUCTION

The International ROP Classification defined the disease according to its severity (stages 1-5), location (zones I-II-III) and duration in hours (1-12 hours), with or without "plus" disease (arteriolar dilation and venous tortuosity). This classification would be an indicator of disease activity. Furthermore, an update to this assessment was recently published.

(ICROP-revisited), being recognized as a more severe form that is affecting the posterior pole (zone I and II), known as threshold disease (4-6 (D)).

ICROP defined threshold disease by the presence of stage 3 ROP, located in areas I or II with an extension of at least 5 continuous hours or 8 hours interspersed and with the identification of arteriolar and venous dilatation known as "plus" disease.

The clinical significance of the threshold disease is that if the premature baby is not treated in time he will have the chance to develop complications and anatomical and functional results in 50% of cases.

The treatment of threshold disease is associated with a 41% reduction in the occurrence of traction retinal folds or retinal detachment and a 19% to 24% reduction in the incidence of blindness when assessed over the next five to 15 years. [7-9] However, despite the availability of treatment and its undeniable benefit, more than 40% of children remain with visual acuity (AV) <20/200 in the treated eye.

Neonatal units for intensive care of premature infants have recognized the need for a specialized ophthalmologist to screen high-risk children. We must keep in mind that not every ophthalmologist has experience in examining or treating premature infants. Even among ophthalmologists, ROP is a very specific domain and few gain enough knowledge and experience for effective eye assessment, treatment indication and disease follow-up. As a general rule, intensive care units must be prepared to provide them with adequate conditions, coordination, training and correct treatment or timely transfer.

1. When is the first eye examination performed on the premature newborn? Which are the criteria for indicating subsequent examinations?

In general terms, the objective of ocular evaluation of the premature newborn adequately detects the largest possible number of cases with indications for treatment, and simultaneously minimizes the number of unnecessary tests. [11,12]

Developing of the evaluation scheme and treatment of prematurity retinopathy:

- the younger the gestational age (GA), the more likely it is that the ophthalmoscopic signs of ROP will appear;
- Ophthalmological signs of the acute stages of the disease usually begin between week 32 and 44; the disease occurs very rarely before week 31, and stage 3 usually occurs between the 34th and 42nd week;
- when the retinal signs start after the 36th week, they rarely evolve towards severe ROP [13,14, 15-18]

Considering gestational age, children born earlier develop the disease earlier than those born closer to term [13,14 12].

In any case, in countries with a high rate of development, the characteristics of premature babies who develop severe forms of ROP differ from those affected in less developed countries, indicating the interaction of neonatal care, survival rate and variations in forms of assessment and ophthalmological follow-up. [2]

Taking into account GA and chronological age (IC), it is recommended that the first examination to be performed between the 31st and 33rd week of GA or between the 4th and 6th week of life [10,19,20].

Subsequent scheduled examinations should be determined by the results of the first examination. If the vascularization is already complete (mature retina), follow-up should be

after six months for the assessment of functional visual development, strabismus, nystagmus or ametropia; Premature babies have a 46% chance of developing some of these eye changes [21].

When vascularization is incomplete (immature retina) or shows any signs of pre-threshold ROP, the evaluation should be every two weeks until complete regression of the signs.

In the immature retina with ophthalmoscopic signs covering area I, examinations should be weekly.

Aim and objectives

The aim of this study was to assess how many premature newborns had ophthalmological (premature retinopathy) and neurological complications (intraventricular hemorrhage) and what was our therapeutic conduct regarding these complications.

MATERIAL AND METHODS

This study is a retrospective study carried out between 2016-2018 and includes 74 newborn patients. From this 74 newborns, only 24 benefited from an ophthalmological consultation. (Figure 1)

Also, from those 24 patients who benefited from the consultation, 10 were diagnosed with ROP. (Figure 2)

Newborns (2016-2018)

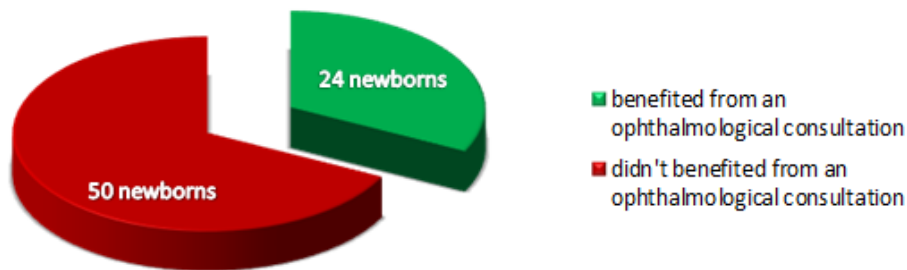


Figure 1. Premature newborns between 2016-2018

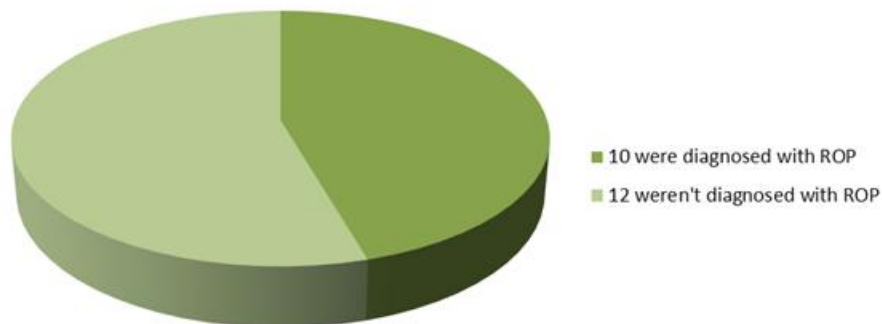


Figure 2. Premature newborns diagnosed with ROP after ophthalmological consultation

RESULTS

From the 74 newborns, this time 73 benefited from a transfontanellar ultrasound. (Figure 3)

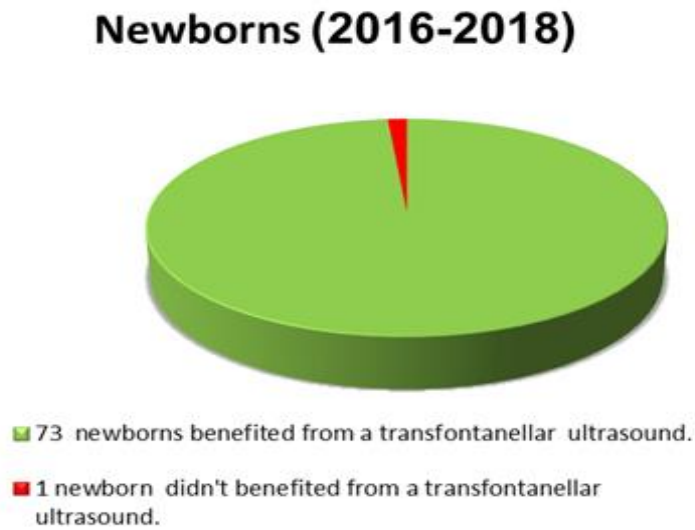


Figure 3. Premature newborns that benefited from a transfontanellar ultrasound

From the 73 newborns who received transfontanellar ultrasound, 65 were diagnosed with intraventricular hemorrhage. (Figure 4.)

From this 65 newborns with intraventricular hemorrhage, 29 were diagnosed with grade I intraventricular hemorrhage, 18 with grade II intraventricular hemorrhage, 7 with grade III intraventricular hemorrhage, 4 with grade IV intraventricular hemorrhage and 7 with subependymal hemorrhage. (Figure 5.)

Also, from the 73 newborns who received transfontanellar ultrasound, 56 were diagnosed with EHIP (Figure 6.) as follows : 3 were diagnosed with EHIP mild form, 28 with EHIP moderate form and 25 with EHIP severe form. (Figure 7.)

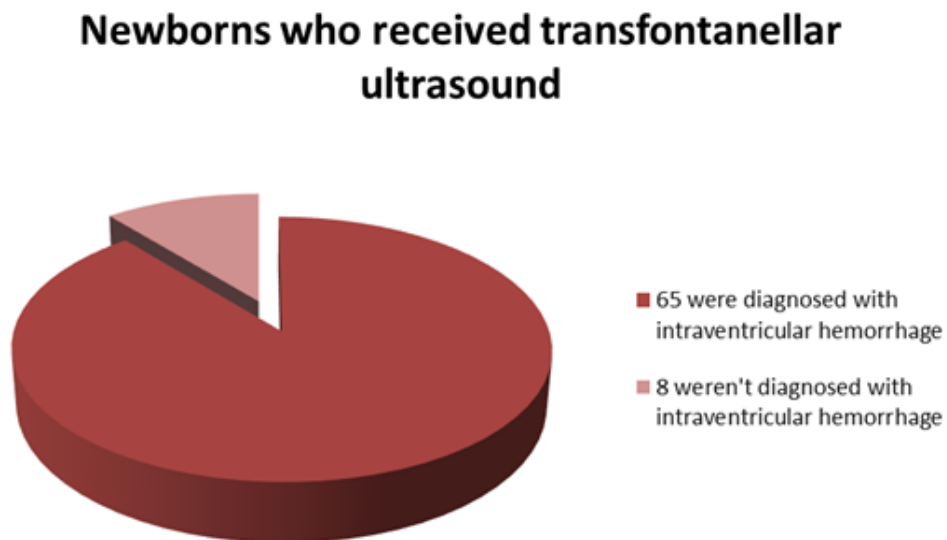


Figure 4. Premature newborn diagnosed with intraventricular hemorrhage

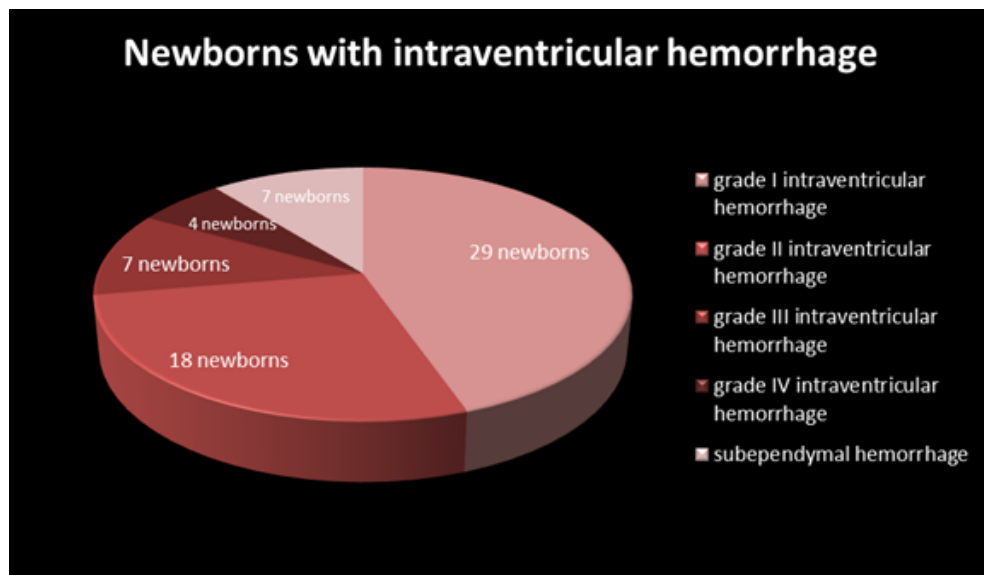


Figure 5. Grades of intraventricular hemorrhage diagnosed in premature newborns

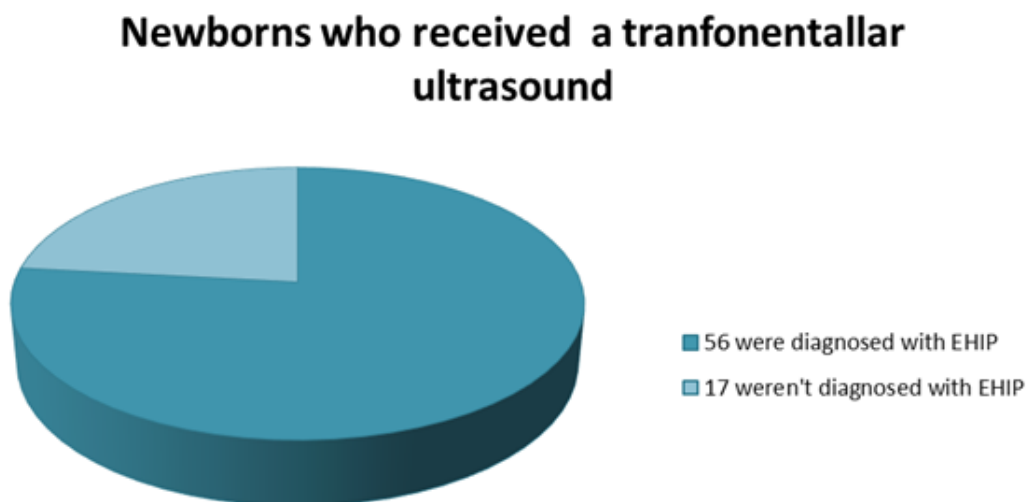


Figure 6. Premature newborns diagnosed with hypoxic-ischemic encephalopathy

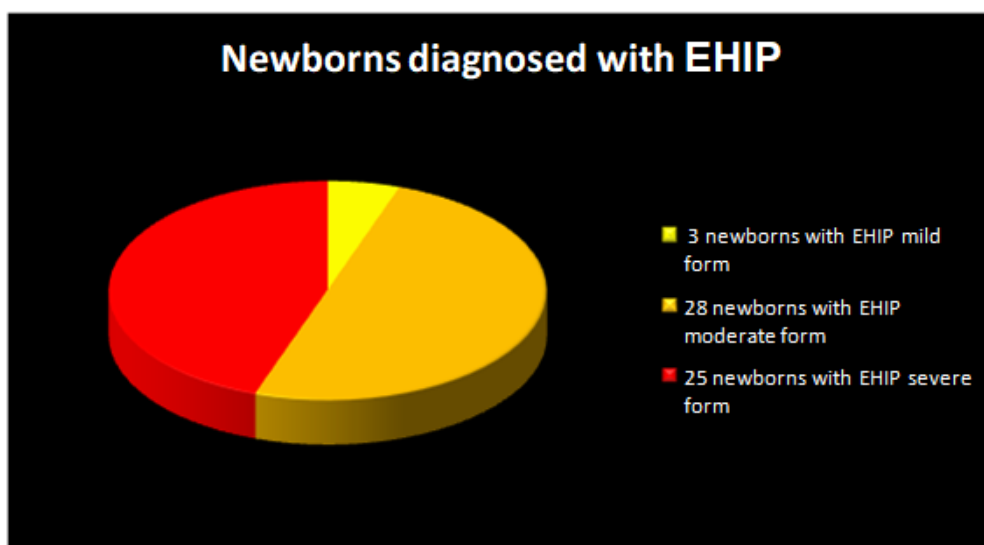


Figure 7. Premature newborns diagnosed with hypoxic-ischemic encephalopathy

Also from the 74 newborns initially studied, 4 were diagnosed with hydrocephalus. (Figure 8)

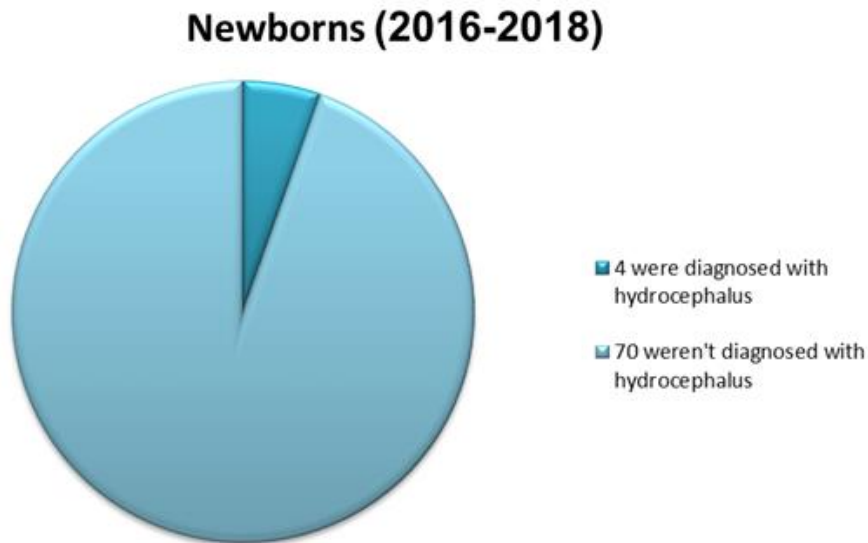


Figure 8. Premature newborns diagnosed with hydrocephalus

DISCUSSIONS

There are many complications when it comes to premature newborns, but the most important ones, that we studied are premature retinopathy, intraventricular hemorrhage and hypoxic-ischemic encephalopathy. As our study show, these complications are relatively frequent and require special attention. The most important thing that a neonatologist has to do in order to diagnose these complications is to perform screening investigations such as transfontanellar ultrasound and ophtalmological investigations. Another important aspect is that after diagnosing the complication, the neonatologist has to perform further investigations in order to follow up the progression of the complications mentioned above. As shown in our study, most of the preterm newborns were diagnosed with intraventricular hemorrhage and hypoxic-ischemic encephalopathy. Few of them were diagnosed with premature retinopathy.

CONCLUSIONS

The initial eye examination should be performed between the 31st and 33rd week of gestational age or between the 4th and 6th week of life. Indication of subsequent examinations should be established depending on the findings of the first examination.

Perinatal hypoxia continues to be a concern for perinatologists and priests and an occupation for too many lawyers, given its possible role in the occurrence of cerebral palsy.

ASPHIXIA is the most frequent acute aggression in the perinatal period, simultaneously with the antecedent of hypoxemia-ischemia, with the characteristic that, in addition to their biochemical changes, HYPERCAPNIA is added, with adequate circulatory effects.

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The importance of the anamnesis in the early diagnosis of oral cancer



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Abstract

Cancer, malignant tumor or malignant neoplasm, is the scientific name of the disease that involves the chaotic multiplication of cells, with the potential to invade and / or spread in all body systems. A number of 47 patients with various types of oral lesions were included in this study. The aim of this study was to evaluate two imaging methods in order to identify abnormal changes in soft tissues by fluorescent light emitted by VEL scope Vx and Oral-iD optical systems. The aim was to evaluate the accuracy of the diagnosis, the sensitivity and the specificity of these methods.

Keywords: Carcinogenesis, VELscope Vx, Oral-iD, neoplasm

INTRODUCTION

Carcinogenesis is the gradual process of transforming a normal cell into a cancerous one. In this process there is an acquisition of properties that allow the malignant phenotype an uncontrolled proliferation, local invasion and metastasis.

Over time, a number of theories and hypotheses have been issued that have led to the explanation of the mechanisms of cancer production. They can be grouped into four categories: the theory of genetic mutation; aberrant differentiation theory; viral theory and clonal selection theory: according to which carcinogenesis is the result of the selection of an autonomous cell population, with increased malignancy, which over time becomes predominant [3].

Currently, carcinogenesis is considered a multistage process that begins with the action of a particular carcinogen, includes all the transformations since the appearance of the first neoplastic cells and ends with the death of the host organism. Several exogenous and endogenous factors contribute to the development of the malignant phenotype - genetic, hormonal, metabolic and immunological [4].

Over time, considerable efforts have been made to determine the cause of cancer. Cancer is a monoclonal condition, originating in a first cell altered by progressively accumulated mutations. The frequency of mutations with oncogenic potential increases in the presence of certain factors. These factors can be classified into somatic factors such as uninfluential risk factors, directly dependent on individual genetic baggage (gastric or bronchopulmonary cancer is more common in men while thyroid cancer occurs more often in women) [6] or genetic factors (a number of pathological genes can cause cancer). This is why certain cancers occur more frequently in certain families, the so-called family aggregation. Lifestyle-dependent factors have a high potential for cancer risk for each individual and especially drugs that are undoubtedly the most carcinogenic [7] and last but not least there are the environmental factors, the microorganisms that cause chronic infections with oncogenic potential [8].

Symptoms are elements of subjective diagnosis found by the patient. A detailed history can highlight a number of relevant symptoms in the case of an oncological condition. Clinical signs are objective findings of the physician. A close clinical examination sometimes indicates the presence of tumors, locoregional lymphadenopathy or another sign suggesting the presence of a malignancy [9]. During the anamnesis, the doctor must take into account some peculiarities of oncological diseases. The open-ended questioning technique allows the patient to add new, potentially relevant diagnostic elements [10]. Rapidly progressive dysphagia or significant unprovoked weight loss in recent weeks / months suggests possible cancer [11].

Living and working conditions can also be an important clue in supporting a diagnosis of malignancy [12].

Some general symptoms and clinical signs of cancer are: Anorexia is present in 15-25% of patients with early malignancy and almost all patients in advanced stages have a decrease in appetite and asthenia.

Local symptoms and clinical signs should also be considered for a concrete diagnosis. The palpable tumor formation, with various locations, can raise the suspicion of malignancy. In malignancies, the tumor formation may be due either to the local evolution of the primary tumor or to its loco-regional or distant dissemination. Any tumor accessible to palpation will be documented as accurately as possible in terms of location, size, shape, consistency, mobility, infiltration of adjacent structures or the overlying skin. Most often the malignant tumor is painless, imprecisely delimited and tends to invade the surrounding structures [13].

The presence of an ulcer, either on the skin or on the mucous membranes may be suggestive of a neoplasm, especially if it persists and has no tendency to heal. Very worrying clinical sign if it occurs in the oral cavity. Ulcers can be painless and can escape examination, especially if they are located in the mucous membranes [14].

Hematic externalization in the form of hemoptysis, epistaxis, hematemesis, melena, hematochezia, rectorage, hematuria or meno / metrorrhagia may be the mode of onset or the only form of manifestation of a neoplasm. The presence of a hemorrhage is not pathognomonic for cancers, but its appearance in any of its forms must draw attention to a possible neoplastic condition. Hemorrhage may be secondary to injury to a blood vessel invaded by a tumor or a clotting disorder in malignant haematological diseases [15].

Pain in malignancies usually occurs in the advanced stages of the disease, when the growth of the primary tumor causes compression or invasion of neighboring structures, especially nerve plexuses.

There is a wide variety of signs and symptoms associated with neoplasms, depending on their location and which generally translate into an advanced stage of the disease [16]. Sometimes the primary tumor cannot be identified, with the secondary determination being the only evidence of malignancy. There are some more common sites of metastasis, but dissemination is possible in any other organ or tissue [17]. Palpation of a lymphadenopathy may be the only sign of lymphatic dissemination, but in the case of bulky lymphadenopathy, other symptoms related to compression of the surrounding organs may occur [18].

Despite the fact that the oncologist has at his disposal an increasingly varied range of investigative methods, some of which only raise a suspicion of neoplasia, and others highlight the tumor, the definite diagnosis of malignancy is always histopathological.

Oral cancer is a common disease in our country, this condition affects the population of Romania in proportion of 4%. One of the main causes is the lack of information among the inhabitants about this disease, the superficial treatment of diseases in the oral cavity and the lack of interest in maintaining its health. However, the prevention of this condition is possible. The aim of this study was to evaluate two imaging methods in order to identify abnormal changes in soft tissues by fluorescent light emitted by VEL scope Vx and Oral-iD optical systems. The aim was to evaluate the accuracy of the diagnosis, the sensitivity and the specificity of these methods.

Oral cancer is located in the head and neck and is any cancerous tissue located in the oral cavity. It can appear as a primary lesion originating in any of the tissues of the oral cavity, as a metastasis or as a congenital structure.

Histologically, the types of oral cancer can be: teratoma, adenocarcinoma derived from the minor or major salivary glands, lymphoma or melanoma. 90% of oral cancers are oral squamous cell carcinoma.

Among the main causes of this disease, of which the inhabitants of Romania are not very aware are the following: excessive tobacco and alcohol consumption, contact with Human Papilloma Virus (HPV), poor oral hygiene, chronic irritations of the oral mucosa, untreated atrogenic lesions (such as incorrectly adapted prosthetic works), root debris of fractured teeth, persistent root debris on the arch that maintains infectious processes, incorrect fillings.

As a general symptomatology the patient may present with apathy, unjustified weight loss, cervical lymphadenopathy and odynophagia (pain when swallowing). In contrast, clinically, oral cancer appears as a nodule or ulceration that is initially painless, but which in evolution is associated with pain, difficulty swallowing, and chewing. In the early stages, the cancerous lesion may be leukoplakia or erythroplasia. The most common symptoms include: erythroleukoplasia, erythroplasia with a smooth surface, which usually becomes malignant, persistent inflammation that does not show signs of healing regardless of treatment in the lips or oral cavity, the appearance of one or more cervical nodules.

MATERIAL AND METHODS

A study of 47 patients with various types of oral lesions was included in this study. In addition to the actual clinical examination, there were detailed discussions regarding the appearance of the lesions and the evolution. Following the anamnesis, a number of 37 patients were excluded from the study because their lesions showed no signs of cancerous or precancerous lesions, with a clear and recent cause. Ten patients were assessed by conventional EOC oral examination, followed by direct visual assessment by fluorescence using VEL scope Vx systems, and Oral-iD.

Areas clinically suspicious or with visual loss of fluorescence were further investigated by surgical biopsy. The association between conventional EOC oral examination and direct visual assessment by EDVF fluorescence was analysed and compared with the results of the histopathological examination.

The optical fluorescence diagnostic system emits a blue light, with a wavelength between 400 and 460 nm, which helps to detect abnormalities or various stages of malignancy of oral soft tissues. The method by which the optical system acts on oral soft tissues is a very simple but very effective. The photons in healthy tissues reflect the light emitted by the optical system, so that they become a neon green colour; while the photons in the diseased tissues no longer react to the light stimulus, and because of this they will appear dark in colour. These colour differences can be seen through the VEL scope Vx optical system due to the filters it contains, but at the same time the differences in reaction to the light stimulus can be captured by a camera attached to the optical system. VEL scope Vx technology is recognized by the World Health Organization as the most widely used adjuvant system for improving the visualization of oral mucosal abnormalities, such as precancerous lesions or premalignant dysplasia.

More than 25 million examinations performed with the VEL scope Vx optical system have been performed by over 15,000 dentists in 23 countries. This technology is more supported by clinical trials than any other adjuvant optical system used for tissue fluorescence diagnosis.

The lesions with malignant potential that were observed in patients were examined twice: the first examination consisted of direct visual evaluation by fluorescence, and the second by surgical biopsy. Malignancy was determined at each lesion, only 3 cases presented a high risk. Specificity, sensitivity, negative predictive value and positive predictive value were calculated using the following formulas:

$$\text{Sensitivity} = \left[\frac{\text{true positive}}{\text{true positive} + \text{false negative}} \right] \times 100$$

$$\text{Specificity} = \left[\frac{\text{true negative}}{\text{negative} + \text{false positive}} \right] \times 100$$

$$\text{Accuracy} = \text{sensitivity} + \text{specificity}$$

$$\text{Predictive value for a positive result (PV +)} = \left[\frac{\text{true positive}}{\text{true positive} + \text{false positive}} \right] \times 100$$

$$\text{Predictive value for a negative result (PV -)} = \left[\frac{\text{negative negative}}{\text{negative negative} + \text{false negative}} \right] \times 100$$

The recommended use of the VEL scope VX for dentists is as follows:

- careful evaluation, review and documentation of relevant medical and dental history;
- performing a thorough extra-oral and intra-oral examination, both visually and manually, palpating all head and neck structures;
- repeating intra-oral examination using VEL VX purpose and visualizing the oral cavity with the VEL scope handpiece to facilitate visualization of the tissue's natural fluorescence.

When viewed with the VEL scope handpiece, the abnormal tissue normally appears as an irregular, dark area that stands out from the normal, green fluorescent pattern of the surrounding normal tissue. This difference in appearance helps the doctor to differentiate

between healthy mucosa and suspicious areas that may require extra attention. If an abnormal mucocutaneous lesion is suspected, the patient will be scheduled for re-examination in approximately two weeks. If the lesion has not healed after this period, more detailed investigations of the tissue in question should be performed according to the usual standards or the patient should be referred to a specialist.

The technology used by the Oral-iD optical system is based on the same functionality as the VEL scope Vx system. However, the method used is blue (fluorescent) light with a wavelength this time between 435-460 nm.

The device comes with a filter for the mobile phone camera, patient goggles and practitioner goggles. By simply wearing goggles, at the touch of a button, the doctor can notice the difference between healthy and diseased tissues. The technology that Oral-iD uses provides a step ahead of oral cancer. Early detection of oral cancer can improve the chance of successful treatment. This system has been evaluated by 1622 uses by 36 practitioners.

Also, as in the case of the VEL scope Vx optical system, the specificity, sensitivity, negative predictive value and positive predictive value were calculated according to the same formulas, in order to detect its effectiveness. Using the same operating concept, the results were centralized and noted in a table, along with the results of histopathological examinations which show their concordance with the evaluations performed in this study.

Patients underwent conventional oral examination before undergoing direct fluorescence examination. This assessment was performed by palpating and inspecting the tissues of interest, but without omitting the rest of the oral soft tissues. The targeted areas were the following: labial mucosa, jugal mucosa, hard and soft palate, tongue: ventral, dorsal and lateral face, inner lips, buccal vestibule, buccal floor.

After the end of the conventional oral evaluation, the direct visual evaluation by fluorescence was performed. The distance of 5-8 cm between the device and the area of interest was observed. The aim was to identify areas of dark soft tissue. With the help of the digital camera attached to the head of the VEL scope Vx, we were able to capture the problem areas, and the camera of the mobile phone was used in association with the machine Oral-iD.

RESULTS

The two optical systems showed 100% sensitivity, 50% specificity in discriminating normal mucosal carcinoma in situ or invasive carcinoma compared to histopathological examination. The positive predictive value was 88.89%, and the negative predictive value was 100%.

Eight of the ten selected patients who were examined by additional methods, showed a positive result of malignant lesion following the biopsy. This lesion was also suspected by conventional oral examination. Therefore, we can easily realize that the first "free" analysis we can offer the patient, to which we must also pay close attention, is the very objective clinical examination of the oral cavity.

The dentist must be careful, just to be able to observe almost instantly any change in the oral soft tissue; changes in color, texture, volume, shape. The objective diagnosis of a single lesion was not consistent with the objective clinical examination, is one lesion was considered malignant on conventional oral examination but proved to be benign following histopathological examination. Usually, the most uneven, ulcerated lesions, easily observable clinically, do not present as much risk as the least creepy lesions, which unfortunately extend inwards and sometimes go unnoticed. Thus, a past lesion almost unnoticed by conventional oral examination, proved to be malignant, following the biopsy.

Regarding the results of histopathological examinations, in terms of direct visual assessment by fluorescence, they are the same as in the conventional oral examination. Eight patients, out of the ten examined, presented identical results in all examinations performed:

conventional oral examination, direct visual evaluation by fluorescence and histopathological examination. Two lesions, detected by direct visual evaluation by fluorescence were not consistent with histopathological examination. However, with respect to the presumptive correct diagnosis rate, sensitivity and accuracy may be taken into account.

Table 1. Results of histopathological examination

Location of the lesion	Clinical changes	Intensity VFL (Velscope + Oral ID)	Histopathological results
Posterior area of the soft palate near the left posterior amygdala pillar	Moderately erythematous area, poorly delimited with extensive proliferation	Area of visual loss of fluorescence, dark in color, well delimited	Invasive squamous cell carcinoma
Hard and soft palate on the left	Poorly demarcated ulcerative area		
Buccal floor	Moderately erythematous area, poorly delimited		
Lip	Moderately erythematous area, poorly delimited		Moderate epithelial dysplasia
The left dorsal face of the tongue	Slightly erythematous area, poorly delimited	Moderate area of visual loss of fluorescence, poorly delimited	Oral carcinoma with squamous cell carcinoma in situ
Hard and soft palate	Moderately erythematous area, poorly delimited with extensive proliferation	The area of visual loss of fluorescence, dark in color, well delimited	Invasive squamous cell carcinoma
The posterior area of the soft palate near the left posterior amygdala pillar	Moderately ulcerated area poorly delimited		
Lower left gum	Moderately ulcerated area poorly delimited		
Upper gum on the right side, hard and soft palate	Moderately erythematous area, poorly delimited with extensive proliferation		
Upper right gum	Moderately erythematous area, poorly delimited		

CONCLUSIONS

These imaging methods are very promising, they are simple and effective for the early detection of premalignant or malignant lesions, but histopathological examinations cannot yet be replaced. They are extremely useful for clinical examination, monitoring of oral lesions and guiding the biopsy. These methods can be considered to add sensitivity to the examination of oral tissues and may be a real adjunct in high-risk patients.

Following the age categories studied, the typology of patients, the conclusion is that males have a greater predisposition to the development of various types of oral carcinomas, as well as heavy smokers who consume excessive alcohol. Oral hygiene is also a contributing factor to the presence of untreated carious lesions, or overflowing fillings, incorrectly treated, temporary fillings long present in the teeth, incorrect prosthetic restorations, complete edentulism incorrectly repaired, persistent decubitus lesions, allergies to various materials.

It is the duty of every dentist to perform a detailed clinical examination, and where he suspects the existence of a malignant lesion or with the potential for malignancy, to resort to complementary examinations; an early detection has a much better chance of healing than a deep lesion, which can spread to different areas.

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Gloves in dentistry - protection and ergonomic implications



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Abstract

The comprehension of the risk of doctor-patient microbial contamination has led to the use of protective gloves at the standard level of precautions. Their widespread use has required increased attention to different types of gloves and their correct use. This article is an overview of the main types of gloves and the implications of their use in daily practice. Considering the attributes of the gloves used by dental practitioners, we presented and detailed three major aspects: the level of protection offered by gloves as a physical barrier, the ergonomic aspects of their use and the risk of complications associated with their use. Finally, it is important to choose the right type of gloves in accordance to criteria related to the medical procedure and the aseptic conditions required, the estimated duration of the procedure, the various dental materials used, as well as in accordance to the possible irritations or allergies caused by wearing gloves.

Keywords: latex, synthetic materials, resistance, ergonomics

INTRODUCTION

The necessity of using gloves in dental practice is generated by the risk of microbial dentist's contamination from the patient or vice versa. There are two main ways that can generate the doctor's contamination in the dental office: the airways, through micro-drops and aerosols generated during the medical procedures and the skin, through direct or indirect contact. Direct contact implies touching the patient's teeth and/or soft tissues, microbiologically loaded, by the doctor. Saliva, blood and other secretions from the oral cavity carry possible pathogens. Possible lesions of the skin on the hands and the space around the nails allow, in the absence of gloves, the microbial contamination of the doctor's hands with germs from the patient. Indirect contact is the contact of the hands of the operator with contaminated instruments, equipment, surfaces or hands during the medical procedures or the accidental injury with sharp contaminated instruments [1]. Without glove's protection, both direct and indirect contacts expose the doctor and the rest of the medical staff to possible illnesses.

The use of gloves in the dental office began to increase in the mid-1980s, as a response to the HIV epidemics, to the risk of infection with hepatitis B virus, and to other blood-borne pathogens. During the same period, the concept of "universal precautions" appeared, according to which the blood and certain body fluids of all patients are considered potentially infectious (HIV, HBV, etc.). Universal precautions are aimed at limiting the exposure of mucous membranes and skin with lesions, possible routes of infection [1].

In 1996 the CDC (Centers for Disease Control and Prevention) expanded the concept of universal precautions and adopted a new term - "standard precautions". These new standard precautions are designed to protect dental practitioners against all pathogens, not just blood-borne ones. They take into consideration the risk of exposure to all bodily fluids, secretions and excretions (sweat except only), so that saliva is also considered a potentially infectious secretion [1]. The 2003 CDC provides detailed recommendations for proper hand hygiene and the wearing of different types of gloves [2].

Aim and objectives

We approached the subject of gloves in dental practice mainly because of their major role in the protection of medical staff and patients but also due to the very diverse offer on the market, which can often make one's choice a difficult task. Outlining the specific characteristics, advantages and disadvantages of different types of gloves, as well as their indications in accordance to the therapeutic act, helps the medical staff use the gloves properly.

Considering the attributes of the protective gloves used by dental practitioners, we identified three major aspects to discuss: the level of protection offered as a physical barrier, the ergonomic aspects of their use and the complications associated with use.

MATERIAL AND METHODS

LEVEL OF GLOVES' PROTECTION AS A PHYSICAL BARRIER

The level of protection offered by gloves depends on their ability to function effectively as a physical barrier between the hand and possible contaminants on various surfaces and tissues. The physical characteristics of the gloves, as well as a number of other aspects of their use influence the degree of protection offered.

Physical characteristics of gloves

The physical characteristics of the gloves depend on the qualities of the material from which they are made and on the manufacturing process. The following materials are most often used for gloves used by doctors:

1. latex (NRL - natural rubber latex),
2. nitrile (synthetic material, nitrile - acrylonitrile-butadiene),
3. vinyl (synthetic material, vinyl or PVC - polyvinyl chloride),
4. neoprene (synthetic material, polychloroprene) [3,4].

Durability or resistance to puncture and wear is often considered in relation to the material the gloves are made of. A number of studies show differences in this regard and thus guide our choice. Latex was the reference value (the excellence value) for durability, but currently nitrile is also considered to have excellent durability. Vinyl is limited in this regard, being less resistant to perforation and wear [3,4].

The elasticity and flexibility of the material are especially significant characteristics because they influence the dexterity of the doctor and the fineness control of the instrumentation [3,4]. By wearing gloves, the doctor's tactile sensitivity decreases significantly, but not as much as to affect the quality of the therapeutic procedures and it can be recovered through exercise [5]. The elasticity and flexibility of latex are superior to the elasticity and flexibility of nitrile (which is more rigid), whereas vinyl has low elasticity and flexibility [3,4].

During the clinical procedures performed by dentists, gloved hands come into contact with various chemicals (antiseptics, composite resins, adhesives, etc.) that can affect the integrity of the glove. Latex and nitrile have a good resistance in relation to different chemicals, but vinyl is less resistant. Beware, however, latex is sensitive to several chemical products and can be degraded by petroleum-containing materials [3,4]. It should also be noted that latex interferes with the setting of addition impression materials (vinyl polysiloxane), fact that has not yet been proven for gloves made of synthetic materials [2].

Neoprene gloves are considered to be comfortable (elastic and flexible) and provide good protection (durability), but they are significantly more expensive than other types of gloves. They are the most effective barrier in relation to the dental materials containing methacrylate [4].

The quality of gloves made of various materials also depends on the correct monitoring and rigorous control of the manufacturing process, a complex process with many stages. The manufacture of gloves basically consists in the immersion of glove formers in a solution or emulsion, followed by a series of other procedures up to the final conformation and detachment of the gloves from the formers. All stages must be well controlled by the manufacturer in order to obtain good quality gloves with optimal properties [3].

Medical gloves are available in powdered or non-powdered versions. The powdered variants have powder (corn starch), in variable quantities on both surfaces of the gloves - inner and outer. Obtaining non-powdered variants requires additional interventions in the manufacturing process [3,4]. The presence of powder creates a number of problems in practice. Thus, when applying and removing powdered gloves, the powder is released into the air, which can lead to respiratory complications. On the other hand, contact of the powder with the doctor's skin involves an increased risk of microbial multiplication on the doctor's skin, irritation, allergies and poor healing of skin lesions. During surgery or periodontal surgery, the powder on the surface of the gloves can reach wounds, favoring microbial multiplication and causing poor healing [3]. Thus, preventive recommendations include the use of non-powdered or only slightly powdered gloves and the avoidance of excessive tension and stretching of powdered gloves, thus limiting the release of powder into the air [3].

The protection offered by gloves depends, in addition to physical characteristics, on other aspects.

The correct choice of gloves in accordance to the medical procedure

Depending on the type of care provided, medical gloves can be gloves for examination and treatment or sterile (surgical) gloves. Both types can be made of latex or synthetic

materials [5]. Surgical gloves must meet standards that guarantee "sterile" character and thus provide maximum safety in protecting wounds from microbial contamination [2].

Hand hygiene and accessories

Wearing gloves does not eliminate the need to wash the hands with an antibacterial soap, which must be done just before applying the gloves and immediately after removing them. The motivation for this need is given by the fact that the gloves may have small imperceptible defects or may be perforated during use which would expose the patient and the surgical wound to contamination. These small defects also expose the doctor's hands. Another motivation for the need to wash hands before and after wearing gloves is the fact that under gloves, in the humid environment, the microorganisms on the surface of the hands can multiply considerably. Thus, it is recommended that washed hands are well dried before applying gloves [2]. There are authors who appreciate that when the hands are visibly clean it is sufficient to disinfect them with an alcohol-based hand sanitizer solution or gel [2,4]. Some studies highlight a misconception of some practitioners that the use of gloves would replace the need for hand hygiene and ensure the guarantee of protection. This concept corresponds to a false sense of protection offered by gloves [4].

The integrity of the skin is itself the most important barrier against medical contamination in relation to the patient and to the work environment and therefore maximum attention must be paid to the health of the skin. [4]. If the clinician has scratches or injuries on fingers or palms, they will first be covered and protected with a patch [2].

Regarding natural nails, they should be cut short because most of the microbial flora of the hands is under and around the nails. Their length must be reduced so as to allow rigorous hygiene and not to strain the gloves, predisposing them to perforations; their edges must be smooth, and if a varnish is applied it must be intact, unblemished. Artificial nails in any form are not indicated when wearing gloves because they predispose to microbial colonization and perforation of gloves [2,4].

Wearing rings under gloves is not recommended because they do not allow proper and complete hygiene of the hands, under them there are spots of microbial multiplication and in addition they can make the application of gloves difficult and can cause rapid wear or perforation of gloves [2,4].

Glove integrity and wearing time

A number of factors affect the integrity of the gloves, including the durability of the material, the wearing time, the medical procedure and the manufacturer. Various studies show a frequency between 6-16% of perforations of the gloves used by surgeons. Most often doctors are not aware of the occurring of minor defects which are difficult to perceive [2].

The wearing time of a pair of gloves affects the degree of protection they offer because the longer the wear, the greater the risk of defects (micro perforations) [4]. A number of studies show that defects occur in a time frame of 30 minutes to 3 hours [7]. Thus, it is recommended to change gloves immediately if there are visible defects or at every one hour of wear. When changing gloves, respectively before applying the new pair of gloves, hands should be washed again or at least disinfected with an alcohol-based disinfectant solution or gel [2,4,5].

During dental therapeutic operations, doctors' gloves also come into contact with multiple chemicals - antiseptic solutions, composite resins, adhesives, etc. - which can affect their integrity [2].

Washing latex gloves with soap, clohexidine-based solutions or alcohol may cause liquid to penetrate through pre-existing minor defects or may cause micro-perforations that predispose to hand contamination and it is, therefore, not recommended [2,4]. After disinfecting the hands with alcohol-based solutions or gels, before applying the gloves, the hands must be thoroughly dried because the remaining alcohol can also affect the integrity of

the gloves [2]. If the practitioner wants to reduce the amount of powder on the surface of the gloves it can be rinsed with plain water [4].

Using two pairs of overlapping gloves

The effectiveness of wearing two pairs of overlapping gloves has not been demonstrated, but studies have shown lower contamination and fewer defects of the inner gloves, fact that suggests increased protection for the operator's hands [1,2]. Thus, wearing two overlapping gloves would provide additional protection, but it must be evaluated in relation to the impairment of tactile sensitivity and manual dexterity, aspects of particular importance to the dentist who performs very fine therapeutic acts and uses small instruments.

ERGONOMIC ASPECTS OF GLOVES USE

The dental practice is of surgical precision and it uses very fine instruments, which require a very good control and maximum coordination of the movements during work. Dental practice specific movements are, besides being highly precise, repetitive and of little amplitude. All the structures in the oral cavity are small and often difficult to access. The gloves come between the doctor's hand and the instrument used, so their impact in practice can be significant. From an ergonomic point of view, gloves are especially important because the doctor's interaction with them is intimate, frequent and long lasting. They must offer, in addition to protection, the guarantee of a safe and efficient grip of the tools and optimal handling. Thus, gloves should not limit or hinder the doctor's movements during therapeutic procedures, this depending on a number of characteristics of the gloves.

Characteristics of gloves that influence grip and dexterity:

- a) elasticity of the material the gloves are made of – this has been discussed in the presentation of the materials.
- b) the conformation of the gloves, they can be ambidextrous or right-left conformed. This aspect can have implications on the posture of the thumb during work, in the sense that the right-left conformed gloves are favorable to the neutral posture of the thumb and offer more comfort and better handling. Ambidextrous gloves are less adapted to the shape of the operator's hands, which implies premature fatigue and a possible limitation of blood circulation. These are usually satisfactory for examination and short interventions, but for long, complex interventions, including surgical ones, right-left conformed gloves are preferable [4]. In general, ambidextrous gloves are packed in boxes with a large number of pieces and are not sterilized. Right-left conformed gloves are usually sterile gloves, packed in pairs and arranged so that the outer surface is not touched and therefore contaminated when the gloves are applied. These are also the most suitable for long, laborious and very fine work (surgery and implantology, endodontics, periodontology). Figure 1 illustrates a pair of right-left conformed neoprene surgical gloves.
- c) the correct choice of size. Gloves must be intimately adapted to the doctor's hands. When they are too small, the gloves will be excessively tensed, which implies a higher risk of premature wear and limitation of the doctor's movements, generating discomfort and muscle tension. If the gloves are too large, the excess material, highlighted on both the fingers and the palm, could be bent, hung and even torn during the handling of the instrument. In addition, oversized gloves can affect the quality of the instrument grip and handling [4,5].
- d) the superficial texture of the gloves and the presence of a micro relief in the area of the fingers are aspects that reduce slipping and favor the grip of the instruments [4]. Figure 2 illustrates the superficial texture of a neoprene surgical glove.



Figure 1. Surgical gloves, neopren

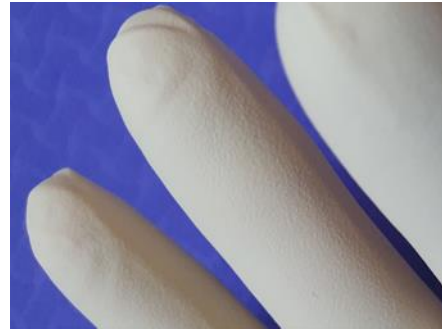


Figure 2. Superficial texture, neopren

In the gloved hand - tool - field of work relationship, each component has an impact on precision, comfort and work safety. As previously presented, the gloves influence the quality of the grip on the instruments and the control of the instruments. In daily practice, there is an interaction between the ergonomic features of the gloves and of the instruments.

The "ergonomic" instruments participate through a series of specific features to the grip. Thus the handle of the manual instruments should be designed as in to ensure optimal grip and control during work:

- an average diameter raging between 7-12 mm so that when using the modified pencil grasp the thumb, the index and the middle finger are positioned easily and there is no need to tighten the instrument;
- the material of the handle and its texture must prevent slipping of the grip fingers. In this regard, plastics and textured metal are preferred;
- in the grip area the handle should have edges, or digit form uneven nesses (concavities) that prevent the instrument from twisting and slipping.

Figure 3 illustrates the grip of an ergonomic instrument, a nitrile glove.



Figure 3. The grip of an ergonomic instrument

The hand pieces of the mechanical instruments must be designed with elements similar to those of the ergonomic handle of the manual instruments, respectively: the surface texture and relief elements in the grip area.

It should not be neglected that, in practice, the humidity of the oral environment can interfere between the gloves and the instruments used and can affect the grip and handling of instruments. Therefore, working in a dry environment, as the one ensured through the use of the rubber dam, offers significant, perceptible advantages during work.

The positioning of the gloves dispenser within reach and the easiness of getting them out of the box are also important ergonomic elements because the gloves getting process is a repetitive task, quite frequent though a day's routine.

Easy glove application is also an ergonomic factor. It depends on the correct choice of size, the conformation of the gloves (ambidextrous or right-left conformed), the patience and attention paid to the application. Properly applied gloves should come over the sleeves of the robe.

The color of the gloves in the bright light of the unit lamp or the additional light sources of loupes or operating microscope, have an impact on visibility, therefore colors contrasting with the rubber dam foil and with the oral environment are preferred. In general, the various colors of the gloves satisfy both the visual contrast and the aesthetic taste of the doctor.

COMPLICATIONS ASSOCIATED WITH THE USE OF PROTECTIVE GLOVES

Complications associated with wearing gloves are important criteria for their choice. They may be irritant or allergenic due to the material or powder.

Non-allergenic irritations are the most common complication, it being associated with latex gloves or synthetic materials and it manifests as a contact dermatitis. They are generated by the chemical components of the manufacturing material or powder and are aggravated when the gloves are too tight generating increased friction with the skin surface. Thus, these complications can be limited by carefully choosing gloves, avoiding those powdered or too small [3].

Allergenic complications can be caused by a number of chemical components used in the gloves manufacturing process (most often residual chemical accelerators in the manufacturing process generate cell-mediated type IV allergies), or by latex protein (rubber tree protein, type I allergy, mediated by antibodies) [2,3]. Latex protein is attached to the powder of the gloves and it is released through skin contact or as an aerosol that can be inhaled [7]. Latex allergy is rare, but more serious, and it ranges from allergenic dermatitis to severe anaphylactic reactions. Once manifested, it requires the avoidance of latex gloves and the use of synthetic materials [2,3]. But there are also patients with latex allergy, generally among those with multiple food allergies, situations in which gloves made of synthetic materials will be used [5,6].

A number of complications are generated by the powder itself. Avoiding them involves choosing lightly powdered or non-powdered gloves [2,3].

CONCLUSIONS

Considering the discussed issues, the choice of gloves becomes an important decision, with significant implications in dental practice. A number of selection criteria can be outlined and used in practice for choosing gloves: the type of clinical act and asepsis conditions to be followed during it, the estimated duration of the procedure, the different dental materials used and last, but not least, possible irritations or allergies caused by the manufacturing material or powder. These are added to other individual, subjective preferences, generated by personal experience with a certain type of gloves, possibly provided by a certain manufacturer. The ergonomic aspects presented emphasize once again the importance of careful gloves choice, so that they satisfy both the protection and safety need during work and the need for comfort at work.

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Observational study on the angulation and the degree of overlap of the maxillary impacted canine



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Abstract

Introduction: The multitude of clinical forms of dental impaction has led to many classification attempts, thus having to use various classification criteria.

The aim of this study was to evaluate the quantitative and qualitative characteristics of the impacted permanent canines.

Material and methods: Parameters measured after Stivaros and Mandall made assessments regarding the canine's angulation to the mid-sagittal plane and the degree of overlap with the root of the adjacent incisor.

Results: The changes obtained regarding the used parameters used mainly noticed at female patients. The impaction of the canine has certain peculiarities depending on its location on the jaw, vestibular or oral, being identified most frequently in the second quadrant. Thus, regarding the presence of canine impaction on the two maxillaries, the frequency is higher in the upper arch.

Conclusions: Managing an impacted canine can be a complex interdisciplinary approach.

Keywords: canine inclusion, Stivaros and Mandall, canine angulation, overlap degree (or degree of overlap)

INTRODUCTION

Canine impaction is a common clinical problem among patients, and its treatment usually requires an interdisciplinary approach.

Surgical exposure of the affected tooth and the complex orthodontic mechanisms that are used to align the tooth on the arch can lead to various amounts of damage to the supporting structures of the tooth, not to mention the long duration of treatment and the financial costs for the patient. Therefore, it is useful to focus on the means of early diagnosis and interception of this clinical situation [1].

Tooth eruption is a complex process, so teeth may appear on the arch earlier, may erupt late or may not erupt at all. Impacted teeth are defined as teeth that remain completely embedded in the bone or mucosa more than 2 years after the physiological eruption. Although there are large variations of the impacted teeth among individuals, molar 3 remains the most common affected tooth, followed by maxillary canines.

There are incriminated several responsible factors for the higher prevalence of canine inclusion; for example, maxillary canines have comparatively longer roots and eruption pathways, grow deep into the jaw, and subsequently erupt into neighboring teeth [2].

There are several methods for diagnosing canine impaction, including: chronological age, clinical examination and radiographic examination. For a correct and accurate diagnosis it is necessary to perform a CBCT in order to present the general case, the location of the impacted canines, prognosis and the follow-up of the tooth eruption and results of the treatment [3]. The predictability of the treatment's success was mainly based on personal clinical experience. The presence of a universal system that provides an improved assessment of the degree of difficulty of correct alignment of the affected canine on the arch would be beneficial for both the patient and the clinician [4]. Pitt et al. have developed a "treatment difficulty index/parameter" for the impaction of maxillary canines. This index/parameter is based on age, midline angle, vertical position, vestibulo-oral position, horizontal position, degree of alignment of the upper incisors, canine space in the dental arch, degree of deviation of the interincisive line and canine rotation [5].

Aim and objectives

The purpose of this study was to evaluate the quantitative and qualitative characteristics of the impacted permanent canines, from a group of minor patients who presented in the Pedodontics Discipline of the Timișoara Municipal Emergency Clinical Hospital. The following were evaluated on orthopantomography: the canine's angulation with respect to the mid-sagittal plane and the degree of overlap with the root of the adjacent incisor.

MATERIAL AND METHODS

Through the observational, retrospective, non-interventional study, the incidence of permanent canines in minor-aged patients was evaluated.

The study was performed on a batch of 29 radiographs of patients, who presented for specialized treatment at the Municipal Emergency Clinical Hospital Timisoara, Pedodontics, between January 2018 - January 2019.

Exclusion criteria: patients over 18 years of age, patients with various genetic syndromes who have dental abnormalities of number / shape, respectively patients with erupting canines. Out of the total number of 29 radiographs, a number of 3 did not meet the inclusion criteria.

In the elaboration of the study, the database of the Discipline was used, according to the examinations performed on the orthopantomographs of the patients.

From the radiological paraclinical examinations of the respective patients, we selected a series of personal data, respectively the dental age of the patients and the sex. By protecting the identity of patients, the incidence of permanent canines was included and the classification of patients according to sex and dental age was established.

Parameters measured after Stivaros and Mandall made assessments regarding:

I. Canine angle to the mid-sagittal plane (Fig. 1)

First degree: 0-15°

Second degree: 16-30°

Third degree: over 30°

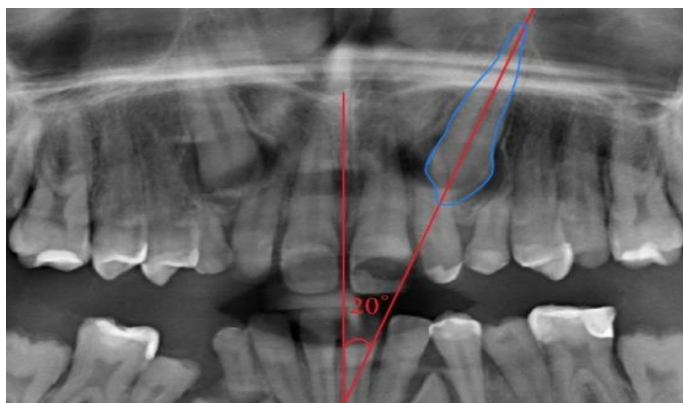


Figure 1. Canine angle to the mid-sagittal plane

II. Degree of overlap with the root of the adjacent incisor (Fig. 2)

First degree: there is no overlap

Second degree: overlap over less than half the width of the incisive

Third degree: overlap over more than half but does not fully cover

Fourth degree: complete overlap over the width of the incisive or even larger

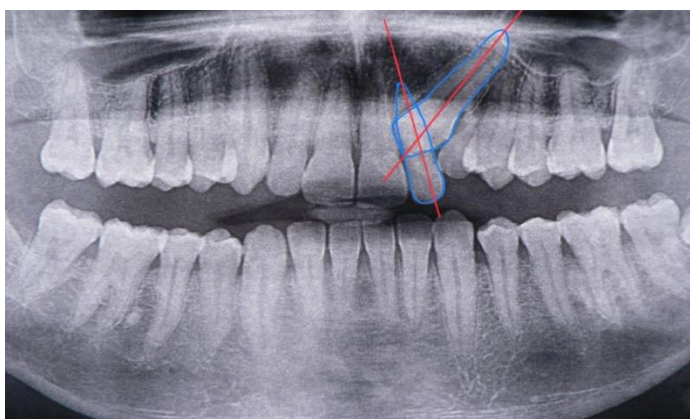


Figure 2. Degree of overlap with the root of the adjacent incisor

III. Canine angle to the mid-sagittal plane

Most frequently, patients have canines with first degree angulation compared to the mid-sagittal plane - 79% of cases, while grade II angulation was identified in 14% of the canines investigated. Only 7% of patients have canines with grade III angulation compared to the mid-sagittal plane (Fig. 3).

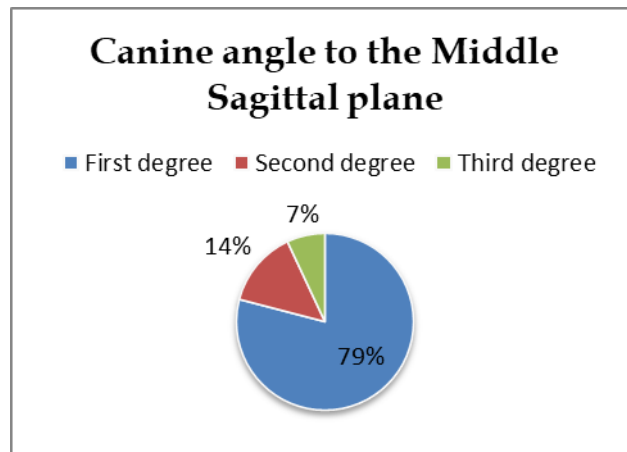


Figure 3. Data distribution of canine angle to the mid-sagittal plane

The gender comparison of the angulation of the canines in relation to the mid-sagittal plane and the degree of overlap of the canines included over the root of the corresponding lateral incisor, the obtained data revealed differences in all the registered parameters. According to the analyzed data, canines have more frequent accentuated angles (grade 2 and 3) in female patients. 68% of canine girls have an angulation of the grade I mid-sagittal plane, while 85% of male patients have a grade I angulation (Fig. 4).

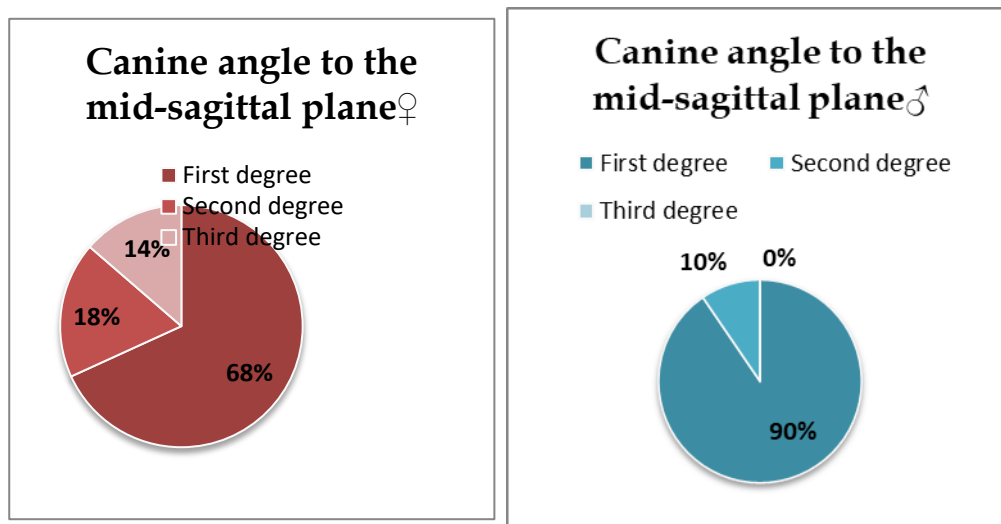


Figure 4. Gender data distribution of canine angle to the mid-sagittal plane

The comparison between quadrants 1 and 2 in terms of canine angulation to the mid-sagittal plane reveals significant differences. In quadrant 1, 76% of canines have grade I angulation and 24% - grade II. In quadrant II, grade I was found in 82% of cases, grade II - 16% and grade 3 - 12% (Fig. 5).

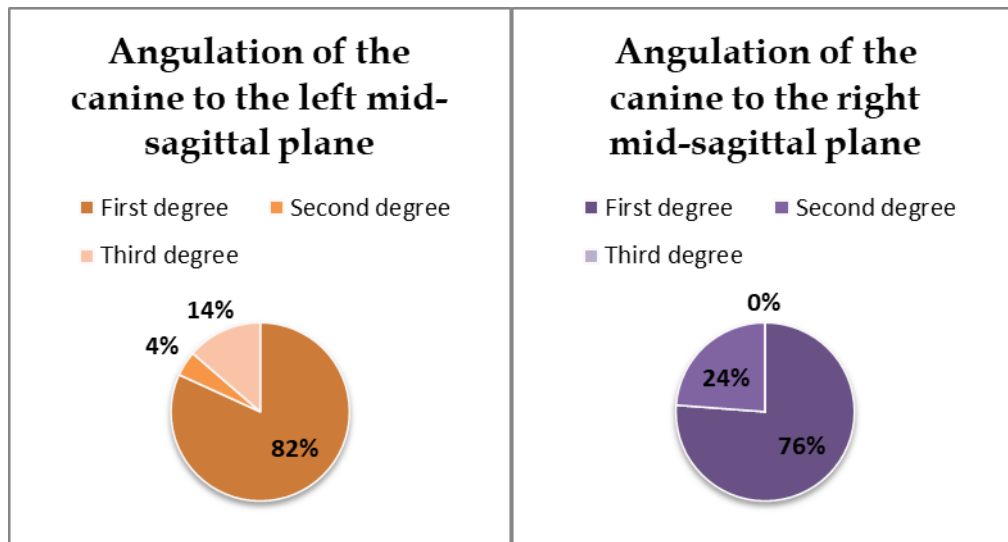


Figure 5. Data distribution of the angulation of the canine to the right and left mid-sagittal plane

IV. Degree of canine overlap with the root of the adjacent incisor

Regarding the degree of canine overlap over the root of the lateral incisor, 63% of all patients presented grade I, 21% - grade II, 9% - grade IV and 7% - grade III (Fig. 6).

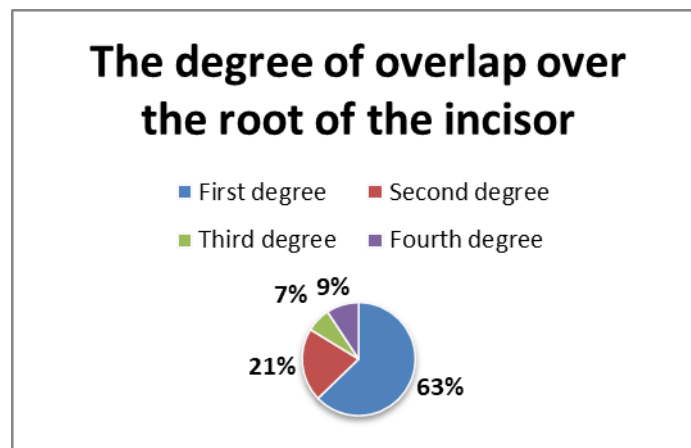


Figure 6. Data distribution of the degree of canine overlap over the root of the adjacent

According to the figures, the high degree of overlap of the canines over the lateral incisors is more common in female patients (14% - grade IV) than in male patients, in whom grade IV overlap was not identified, in addition, only 5% of the male patients showed grade III overlap. 86% of them have a low degree (degree I) of overlapping of the canine over the root of the lateral incisor. Only 41% of the female patients have grade I, 32% - grade II, 18% - grade IV and 9% - grade III (Fig. 7).

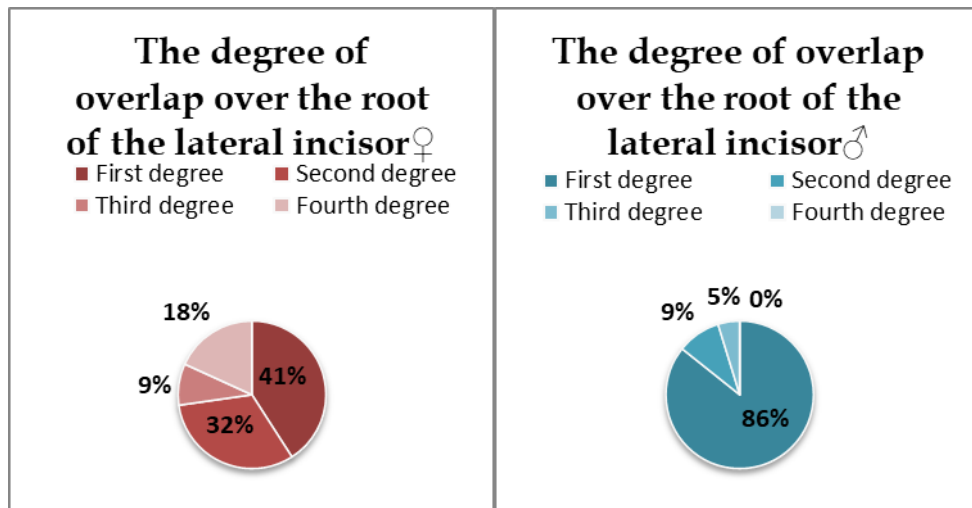


Figure 7. Gender data distribution of the degree of overlap over the root of the lateral incisor

According to the measurements, the degree of overlap of the canines over the root of the lateral incisor is higher in quadrant 2, compared to the first quadrant. On the right side, the most frequently observed was the first degree overlap, in descending order of frequency we identified grade II in 24% of cases analyzed on the right side, grade III and IV are represented by 5 percent each. At the level of quadrant 2, 59% of patients have grade I overlap, 18% - grade II, 14% - grade 4 and 9% grade III (Fig. 8).

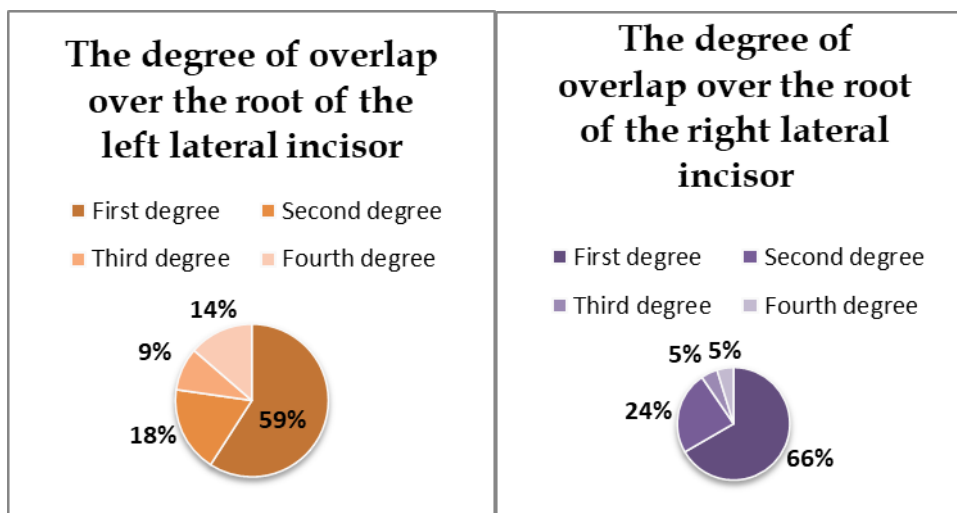


Figure 8. Data distribution of the degree of overlap over the root of the right and left lateral incisor

RESULTS

Regarding the canine impaction, while using the criteria of Stivaros and Mandall, compared to the mid-sagittal plane, a statistically significant difference was observed between the two sexes regarding the angulation of the canine of grade I, the male patients being affected in proportion of 85% compared to female ones, where values were recorded in proportion of 68%. In the case of females, a predisposition for grade II and III angle values was observed. In quadrant I, a higher frequency of the type I canine angulation was found (76%), followed by grade II (24%) and no grade III value was recorded; in comparison, in quadrant II there was a frequency of 82% for grade I, 14% for grade II and only 4% for grade III.

Regarding the degree of overlap of the canine over the root of the lateral incisor, the following sequence was identified: 63% - grade I, 21% - grade II, 9% - grade IV and 7% - grade

III. In the case of female patients, grade IV (14%) was more common compared to male patients where no case of this grade was identified. While in the case of male patients grade I was identified in 86% of cases, in females a percentage of only 41% was observed. Regarding the distribution by quadrants, there was a higher frequency of canine impaction in quadrant 2, the highest proportion being grade I in both quadrant 2 (59%) and quadrant 1 (66%). The lowest parameters in quadrant 1 were those of grade III (5%) and IV (5%), compared to quadrant 2 where 9% of cases were grade III.

DISCUSSIONS

To design a correct and effective treatment plan, the diagnosis of dental abnormalities is essential. Thus, knowing the ethnic differences is important in the dental routine, in order to avoid possible future complications.

In a study conducted for the Gizan population of Saudi Arabia, the following factors were taken into account: patient age, canine angle to midline, vertical position, bucolingual position, horizontal position, incisor alignment, canine space, upper and lower interincisive lines, rotation teeth included [6]. The angle of the canine towards the mid-sagittal line in male patients was mainly grade 3 (27%), as opposed to 6% in the case of our patients, and grade 1 was registered in a percentage of 4% compared to 85%. Regarding female patients, grade 3 was found most frequently (50%) and grade 1 the least (20%) compared to our results in which grade 1 was 68% and grade 3 was 14%. Regarding the degree of overlap of the canine over the root of the lateral incisor, in male patients, the majority have a higher degree of overlap (22%), in our country being dominant (86%) grade 1, without overlap. In the case of women, the high degree of overlap (36%) is very close to grade 1 (35%), unlike our results, in which the highest percentage (43%) is for grade 1 and grade 4 is present at 14% of patients. The results of this study showed that canine impaction was twice as common in female patients, while the index of difficulty in orthodontic treatment was higher in male.

According to the study by Maged-Sultan, Hanan-Ahmed and Abeer-Abdulkarem, the patient's age is an important factor in the treatment of forced eruption in childhood or adolescence, because with age, the impacted tooth may become ankylosed. But an increased angulation of the mid-sagittal line may indicate surgical treatment, not a forced eruption. [6].

According to a study by Sung-Hun et al., in which the position of the canine roots impacted on the panoramic radiographs was analyzed, 44.2% had a labial position and 38.5% palatal. Labial inclusion is often attributed to crowding, as opposed to palatal impaction, which can occur in their absence, so it is difficult to prevent the inclusion of canines in the developmental stage. However, an early diagnosis can prevent root resorption of neighboring teeth, cyst formation and pain [7]. If the apexes of the canine roots impacted palatally are oriented towards the first maxillary premolars, the canine crown will most likely be located mesially, towards the lateral incisor. If the apex is oriented towards the lateral incisor, it is likely to be impacted in the labial position [7].

In the study conducted by Bandar Alymi, Ramat Braimah and Saeed Alharieth, the prevalence and characteristics of the impacted canines were analyzed. 2000 panoramic radiographs were analyzed, of which 107 cases of canines were highlighted, resulting in a prevalence of 5.35%.

Amongst the patients with impacted canines, 38 were male, and the remaining 69 were female, with an M:F ratio of 1:1.8. The patients were between 15 and 75 years old. More affected were the maxillary canines (92.5%) than the mandibular ones (7.5%). The palatal position was discovered more frequently than the vestibular one [9].

According to the study by İlhan Metin Dağsuyu, Fatih Kahraman and Rıdvan Okşayan, who analyzed 140 canines impacted on CBCT in 102 patients, unilateral impaction was found in 64 subjects, while the remaining 38 had bilateral impaction and 14 canines

showed severe resorption. The lateral incisor was more frequently affected than the first premolar. Angulation of the midline in the impacted maxillary canines of the right hemiarcade was significantly higher than in the left hemiarcade ($p < 0.05$). [10].

CONCLUSIONS

This study on canine impaction, like most in the literature, shows results based on the 2D image. No significant differences were found between male and female patients. Grade 1 was recorded in both groups, in terms of canine angulation to the mid-sagittal plane and the degree of overlap of the canine over the root of the lateral incisor.

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Comparative study on linear dimensional stability between condensation silicones and addition silicones using the sandwich technique



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Abstract

Purpose: The study refers to the linear dimensional stability of silicone elastomers by comparing silicones with condensation curing and silicones with addition curing.

Materials and Methods: The present research is represented by an "in vitro" study, interested only in the evolution of the dimensional stability of silicone elastomers in terms of the material used. A control model was created made of a hard plastic with which the existing samples were compared. The photographic documentation of each study model was made, in order to later document the differences obtained compared to the control model.

Results: All photos taken were analyzed using a photo analysis software (UTHSCSA ImageTool, version 3.0). The measurement results were recorded in tables and statistically analyzed.

Conclusions: The ideal material in terms of dimensional stability is represented by addition cure silicone.

Keywords: Condensation Silicone, Addition Silicone, ImageToll, Dimensional Stability

INTRODUCTION

The dental imprint within the fixed prosthesis represents the negative copy of the prosthetic field and is part of the first stage in the realization of the treatment plan in order to restore the fixed prosthesis.^{1,2} It must reproduce the preparations of the teeth as accurately as possible, using the most accurate materials for recording the prosthetic field, in order to finally offer the patient the comfort he needs through a prosthetic restoration that is as faithful as possible.^{3,4}

The choice of impression materials is made on the basis of imposed conditions: plasticity, fidelity, elasticity and mechanical strength, dimensional stability, curing time, compatibility with modeling materials.⁵

The impression materials that are used today have undergone considerable changes in terms of properties, but are not yet able to fully meet all the necessary conditions.^{6,7} The ideal material should have adapted mechanical properties in order to withstand stresses from different clinical situations.^{8,9}

In order to obtain the most accurate replica, it is necessary that the impressions be cast in the shortest possible time, according to the manufacturers' recommendations, in order to be able to carry out the next prosthetic restoration as accurately as possible.⁵

Aim and objectives

This paper refers to the realization of an "in vitro" study that is based on the use of two types of impression materials, which are part of the category of synthetic elastomers. These are represented by silicone elastomers: condensation silicones and addition silicones (polyvinyl siloxane).

The scientific objectives of the study refer to the discovery of current linear dimensional variations specific to synthetic elastomers within 24 hours from the first manipulation of the material to the time of casting the models. The results obtained will be recorded in terms of materials used.

MATERIAL AND METHODS

The present study is based on the use of a control model from Frasco that simulates a clinical situation similar to that of the oral cavity. The model used is considered to be the control model because with it the samples resulting from the impressions will be compared, at the level of which four reference grooves were made.

The impression of the model is made using a standard metal impression spoon, inside which the materials used will be inserted. These grooves aim to measure the distance between them by means of six reference lines to which the changes occurred after the impression will be observed.

Materials used were represented by two products: a silicone with condensation curing - Zeta Plus L (Zhermack®) and two types of materials represented by silicones with addition curing - Elite HD + (Zhermack®) and Variotime (Heraeus Kulzer®).

With the help of the three products, the control model was moulded using the sandwich technique - 1 single time, making 3 recordings for each. In the end, the mouldings resulted in 9 impressions.

Given the purpose of the study, we chose the casting time to be 24 hours after the moulds were made. The decision was based on the comparison of the materials used, finally reaching the conclusion related to the choice of the ideal material in terms of dimensional stability.

RESULTS

To investigate all 9 resulting photos, it was necessary to use a photo analysis software (UTHSCSA ImageTool, version 3.0). The photos were calibrated, taking into account the fact that the image has the Pixel as a unit of measurement, and the imprints were measured in millimeters, conversion being necessary to avoid measurement errors and to obtain data as accurate as possible for the study.

Thus, by joining the 4 holes at the level of the occlusal surface resulted 6 lines that were numbered with letters (from A to F) each line having two correspondents. The distances between the holes were highlighted as follows: Line A: distance from 4.5. at 4.7., Line B: distance from 4.7. at 3.7., Line C: distance from 3.7. at 3.5., Line D: distance from 3.5. at 4.5., Line E: distance from 4.5. at 3.7., Line F: distance from 3.5. at 4.7. (figure 1).

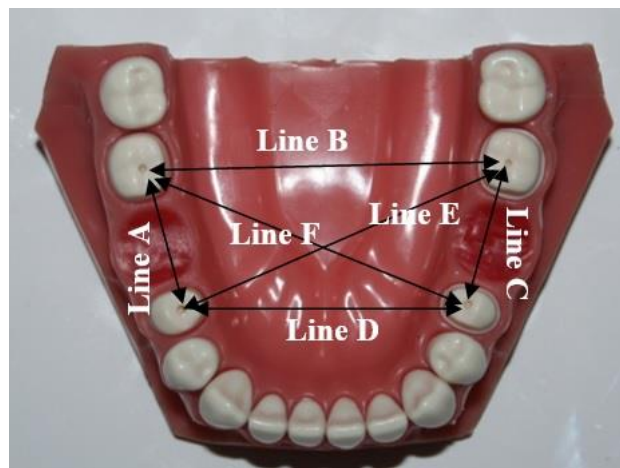


Figure 1. Control model with the four holes at the occlusal surface.
Distances between holes marked by reference lines (A-F)

The reference values in mm were established on the control model, and then the 9 models were analyzed. Values measured at the level of the six lines: Line A - 19,92 mm, Line B - 50,69 mm, Line C - 20,10 mm, Line D - 39,46 mm, Line E - 49,78 mm, Line F - 48,78 mm.

All measurements resulted in a series of information that was systematized by establishing the Median (\bar{X}) and the Standard Deviation (DS), thus having an overview of changes in the linear dimensional stability of silicone elastomers. (table 1).

Table 1. Analysis of the models made by establishing the Median (\bar{X}) and the Standard Deviation (DS)

Reference lines	Imprint material					
	Zeta Plus L		Elite HD+		Variotime	
	\bar{X}	DS	\bar{X}	DS	\bar{X}	DS
Line A 4.5. → 4.7	19,57 mm (0,35 mm)	0,175	19,71 mm (0,21 mm)	0,105	19,76 mm (0,16 mm)	0,008
Line B 4.7. → 3.7.	50,29 mm (0,40 mm)	0,200	50,42 mm (0,27 mm)	0,135	50,62 mm (0,07 mm)	0,035
Line C 3.7. → 3.5	19,61 mm (0,49 mm)	0,245	20,02 mm (0,08 mm)	0,004	19,73 mm (0,37 mm)	0,185
Line D 3.5. → 4.5	39,11 mm (0,35 mm)	0,175	39,26 mm (0,20 mm)	0,100	39,33 mm (0,13 mm)	0,065
Line E 4.5. → 3.7.	49,57 mm (0,21 mm)	0,105	49,64 mm (0,14 mm)	0,070	49,34 mm (0,44 mm)	0,220
Line F 3.5. → 4.7.	48,38 mm (0,40 mm)	0,200	48,60 mm (0,18 mm)	0,090	48,69 mm (0,09 mm)	0,045

DISCUSSIONS

Data from the literature refer to two methods of assessing dimensional stability: one is based on impression analysis and the other on cast models after the impressions have been registered.⁴

In our study all the materials achieved the dimensional stability within 24 hours after impression.

In the study conducted by Gonçalves¹⁰, a study based on data from the literature, it was concluded that condensation silicones are the ones that record the most errors in terms of dimensional stability. Regardless of the time when the impression is to be cast, they are not stable, recommending that the casting not be made later than 30 minutes after the impression so that the future prosthetic restoration is adapted as correctly as possible.

In our study, even if the casting was chosen 24 hours after the impression, the significant differences between the values obtained compared to the values of the control model determined us to reach the same conclusion reached by Gonçalves¹⁰, which is why we do not recommend using this material for fixed prosthetic works especially the overall ones.

Vitti¹¹ in his 2011 study concluded that in general, addition polyvinyl siloxane are the most dimensionally stable. They do not show significant differences either between themselves and with respect to the data recorded at the level of the prosthetic field. These small differences can also occur after packaging the products, thus referring to their composition. In our study we reached the same conclusion regarding the use of addition cure silicones in the impression of the prosthetic field.

Given that the control model was represented by the edentation of the lower first molars 3.6 and 4.6. respectively, the study was oriented in the direction of analyzing the distances between several points. There were 6 baselines based on which all results were recorded.

Following these results, the values obtained from each material in which the Average (\bar{X}) of the values obtained and the Standard Deviation (DS) were established, were interpreted. Thus, we concluded that: the lowest value at the level of dental impressions was 0.07 mm (\bar{X}) and 0.035 DS, the values belonging to the polyvinyl siloxanes batch represented by Variotime (Heraeus Kulzer®) material, whereas highest values for the condensation silicones - Zeta Plus L (Zhermack®) were recorded being 0.49 mm (\bar{X}) and 0.245 DS.

CONCLUSIONS

Following the study, we concluded that : the least indicated material to be used in terms of dimensional stability in fixed prosthetics is with condensation silicones, and the ideal material in terms of dimensional stability is polyvinyl siloxanes.

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Management of the Alveolar Ridge Preservation after Tooth Extraction: A Review



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Abstract

This review aims to evaluate the scientific evidence on the efficacy in the surgical protocols designed for preserving the alveolar ridge after tooth extraction and to evaluate how these techniques affect the placement of dental implants and the final implant supported restoration.

Alveolar ridge preservation (ARP) procedures have become one of the most commonly performed surgical procedures in dentistry, due to increased demand for dental implant therapy. Previous studies have repeatedly shown a naturally healed socket could lose up to 50% of its buccolingual width, which in turn would negatively impact the future implant placement. ARP procedures have been shown to consistently reduce the amount of post-extraction horizontal and vertical bone loss; however, it is still not conclusive which biomaterial or technique is the most superior. The purpose of this article is to review current evidence on various ARP procedures.

Keywords: Bone regeneration, tooth extraction, dental implants, review, ridge preservation

INTRODUCTION

FDI World Dental Federation General Assembly approved in 2016 a new definition of oral health "Oral health is multifaceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow, and convey a range of emotions through facial expression with confidence and without pain, discomfort, and disease of the craniofacial complex" (Glick M, 2016). Accordingly, to this theory dentists strive to preserve dentition in its optimal function and comfort. Dental implant therapy requires good understanding of the biological processes, such as healing of extraction sockets and tissue remodelling during and after osseointegration, to obtain a long-term success. To achieve an adequate three-dimensional osseous volume is critical for long-term aesthetic and functional stability, as well as, for a prosthetically driven implant placement (Buser D, 2004).

The alveolar bone is direct dependent on tooth surface. Dental extraction inevitably leads to substantial loss in bone volume and increases the complexity of implant therapy (Tan WL, 2012). The dynamics and magnitude of these changes have been investigated in humans (Trombelli, 2008). The amount of vertical and horizontal resorption of the socket walls has been investigated with different methods, ranging from studying and measuring cast models to radiographic analysis, clinical assessment with individually pre-fabricated acrylic stents during re-entry surgeries and histological studies in experimental animal models. This studies evidenced that after 12 months of a tooth loss a reduction of approximately 50% in alveolar ridge width can happen and in the first 3 months two thirds of the total dimensional change occur (Schropp L, 2003). The key processes of tissue modelling and remodelling after tooth extraction lead to a reduction on the overall ridge dimensions with significant changes in both the buccal and lingual bone crests. The changes that occur may affect the outcome of the ensuing therapies that aim to restore the lost dentition, either by limiting the bone availability for ideal implant placement or by compromising the aesthetic result of the prosthetic restorations. To counteract the hard and soft tissue resorption after tooth extraction, various alveolar ridge preservation (ARP) techniques have been used (Jung RE, 2018). Regarding different socket preservation therapies different techniques were used ranging from a careful flapless tooth extraction aiming for an undisturbed socket healing (Fickl, 2008) to the immediate placement of dental implants (Paolantonio, 2001) to filling the resulting alveolar socket with different grafting materials, with and without barrier membranes (Fickl, 2008).

The outcomes between flapped conventional surgery and flapless surgery during tooth extraction show no significant differences (Araujo, 2005). An other method applied to preserve bone after tooth extraction using grafting procedures or guided bone regeneration (GBR). The application of regenerative bio-materials, such as bone autografts, allografts, guided tissue regeneration procedures, xenografts and most recently, growth factors, has been evaluated with varying degrees of success to maintain the anatomical dimensions of the alveolar ridge after tooth extraction.

The objective of the study is to systematically review the evidence regarding these therapeutic interventions for socket preservation after tooth extraction and to assess systematically the potential benefit of such techniques/materials when compared with what occurs when the socket is left to heal spontaneously.

The aim of this review is to present fundamental background and clinical outcomes of ARP techniques and to debate appropriate care in ridge preservation procedures for implant therapy.

MATERIAL AND METHODS

The protocol developed to cover all the review aspects contained the standard situation, spontaneous healing at post-extraction alveolar sockets as well as different alveolar

ridge preservation techniques using bovine xenografts, porcine xenografts, allografts, alloplasts. The therapeutic interventions evaluated in this study were filling the socket with autologous bone grafts or bone substitutes, as well as the use of barrier membranes to isolate the socket compared to the spontaneous healing of the socket.

After tooth extraction, the alveolar process goes through changes that are associated with disruption of blood supply from the periodontal ligament which in turn results in increased osteoclast activity. Bone resorption on the buccal/facial aspects is much more pronounced than that on the lingual/palatal aspects, which is believed to be due to differences in bony plate thickness (Araujo MG, 2005). Regarding, the histological healing process the bone undergoes three phases, inflammatory, proliferative and modelling/remodelling (Araujo MG S. C., 2015). Comparing different studies, the bone tissue underwent significantly more horizontal dimensional reduction (3.79 ± 0.23 mm) than vertical reduction (1.24 ± 0.11 mm at mid-buccal aspect) at 6 months (Tan WL, 2012). The ridge width loss represented 32% of the original width at 3 months and 29–63% at 6–7 months. The dimensional changes in bone measurements were comparable in another systematic review, with 3.87 ± 0.82 mm loss in alveolar ridge width and 1.67 ± 1.11 mm loss at mid-buccal height (Van der Weijden F, 2009). The soft tissue alteration, 0.4–0.5 gain of soft tissue thickness at 6 months on buccal and lingual aspects was reported by Tan et al. Chappuis et al. reported that the soft tissue dimensional changes were linked to the underlying bone phenotype (Chappuis V, 2015). The facial soft tissue thickness remained stable over 8 weeks (from 0.8 to 0.7 mm) in thick bone phenotype (facial bone thickness ≥ 1 mm), while “spontaneous soft tissue thickening” occurred (from 0.7 to 5.3 mm) during the same period of time when the underlying facial bone was thin (thickness < 1 mm). More than 51% of the thickening happened within 2 weeks of extraction.

Atraumatic extraction technique should be applied to avoid undesirable expansion or fracture of the thin facial/buccal socket wall. It is recommended to section and remove each root separately when a multi-rooted tooth must be extracted. While minimal bone resorption at 3 months with use of atraumatic extraction technique was reported, post-extraction buccal plate fracture (9%) and dehiscence (28%) could also occur (Leblebicioglu B, 2015). Several human studies indicated that thin buccal plate (could be ≤ 1 mm or < 1.5 mm) was associated with significantly more severe bone resorption in both ridge width and height (Cardaropoli D, 2014). The management of alveolar sockets at the maxillary anterior teeth needs to be cautious because the thickness in most sites was usually ≤ 1 mm (close to 50% of sites with ≤ 0.5 mm) as reported in a CBCT study (Abdelhafez RS, 2016).

Dental professionals should keep the biological information of spontaneous socket healing in mind. When the risk of drastic dimensional changes is present, we should explain the concerns well to patients and take precaution of preserving alveolar ridge and avoiding immediate implant placement.

The ideal situation regarding the patient is the immediate implant placement. To enhance the success rate and reduce undesirable complication of the immediate implant placement, in the anterior maxilla, the clinical condition should be intact socket walls, thickness of facial bone wall ≥ 1 mm, thick soft tissue, absence of acute infection, and availability of bone apical and palatal to the socket for primary stability of implants (Morton D, 2014). Other consideration that should be taken in account are patient-specific factors such as age or medical, financial, or social concerns requiring postponed treatment (Chappuis V A. M., 2017). If immediate or early implant placement is not indicated, application of alveolar ridge preservation should be considered to limit post-extraction ridge alternations, promote soft and hard tissue healing, and facilitate implant placement at a prosthetically ideal position.

To preserve the alveolar ridge dimension the therapist can explore socket grafting, partial extraction therapy (PET), and immediate implant placement. Although it was initially

suggested that immediate implant placement could prevent remodeling of extraction socket, more evidence indicated that significant horizontal and vertical bone resorption occurred following immediate implant placement. The current procedure for alveolar ridge preservation is the socket grafting with or without a barrier membrane or soft tissue graft (for socket closure) due to its conceptual attractiveness and technical simplicity (GJ., 1996).

This review will focus on the findings of previous systematic reviews whose inclusion criteria may be slightly different (Lai P.C., 2020) (Vignoletti F., 2011). The biomaterials used for their efficacy were autologous bone graft, allografts, xenografts, alloplasts, autologous blood derivatives, and biologics. Avila-Ortiz et al. reported that when all bone substitutes were compared with spontaneous healing, ARP-socket grafting leads to significantly less horizontal bone resorption (mean difference (MD) = 1.99 mm; 95% CI 1.52–2.44) and significantly less vertical bone loss at midbuccal aspect (MD = 1.72 mm; 95% CI 0.96–2.48) and mid-lingual aspect (1.16 mm; 95% CI 0.81–1.52) (Avila-Ortiz G, 2019). With regard to different types of bone substitutes, particulate bovine xenografts (MD = 2.24 mm; 95% CI 0.10–4.39), porcine xenografts (MD = 2.25 mm; 95% CI 1.86–2.64), and particulate allografts (MD = 2.01 mm; 95% CI 0.54–3.48) lead to more favorable outcome than collagenated bone xenografts (MD = 1.2 mm; 95% CI 0.14–2.26) or alloplasts (MD = 1.25 mm; 95% CI 0.79–1.71) in clinical horizontal bone changes. ARP-socket grafting was found to be most effective at sites with a buccal bone thickness ≥ 1 mm (3.2 mm less horizontal bone loss compared with extraction alone). They also reported that sites with ARP-socket grafting were less likely to need ancillary bone grafting prior to or at the time of implant placement, while no conclusion could be derived regarding the effects of ARP on implant survival/success rate. ARP through socket grafting effectively attenuates the dimensional changes following tooth extraction. Willenbacher et al. reported in their meta-analysis that an implant could be placed in the desirable position without further augmentation in 90.1% of the sites receiving ARP while that could be done in only 79.2% of the naturally healed sites (Willenbacher M, 2016). This techniques have good potential, but the success depends on strict case selection and operator experience.

RESULTS

Some of the most investigated bone augmentation materials are deproteinized bovine bone matrix (DBBM) and a mixture DBBM plus 10 % porcine collagen fibers (DBBM-C). In some studies, comparing the use of the porcine matrix (DBBM-C) in combination with a collagen membrane with spontaneous healing, a reduction in horizontal bone loss is reported (with bone loss ranging from 1.0 to 1.6 mm) (Clementini M, 2019) (Jung RE S. V., 2018) while others show no significant difference (Iorio-Siciliano V, 2020). One of the studies showed the effectiveness of DBBM-C in ARP for stopping sinus pneumatization (grafting 0.14 mm vs. spontaneous healing 1.16 mm) (Cha JK, 2019). An ARP study that uses a polyethylene glycol (PEG) membrane in combination with DBBM, FDBA (freeze-Dry bone allografts) and blood clot shows that the best method would be FDBA with PEG (Santana R, 2019), the same authors study the benefits of enamel matrix derivative (EMD) in alveolar ridge preservation procedures (Lee JH, 2019).

Machtei et al. made a comparison between the alloplastic graft (biphasic calcium phosphate / hydroxyapatite) and DBBM in the ARP procedure (Machtei EE, 2019). Both had better results than spontaneous healing by blood clot and also the alloplastic graft seems to keep the bone in width.

In one study, two bone substitution materials were compared: collagenated porcine bone plus a cross-linked CM and DBBM-C plus a non-cross-linked CM. The results at 4 months reported that both groups were effective in preserving alveolar width (porcine 1.3 mm vs. DBBM-C 1.5 mm) (Lim HC, 2017). In another three-armed RCT, different types of

porcine xenografts were evaluated in ARP procedures (Barone A, 2017). Both of collagenated cortico-cancellous porcine bone (0.93 mm) and particulate cortical porcine bone (1.33 mm) preserved more bone than spontaneous healing (3.60 mm) also the grafted groups showed less vertical bone loss. Tallarico et al. show that there is a significant difference between the group that received a delayed implant placement (xenograft) and the group that received an immediate implant. (0.23 mm vs. 0.61 mm).

The ARP method was compared with FDBA and spontaneous healing. Sun et al. and Walker et al. reported significant differences in alveolar preservation in width but also in height (Sun DJ, 2019) (Walker CJ, 2017). In a randomized control trial was investigated collagen plugs/FDBA and porcine collagen matrix/ FDBA and the authors showed that these two combinations worked equally better and with no dimensional significant differences outcomes (Natto ZS, 2017). Hong et al. tried two different techniques with FDBA plus collagen membrane open site and with primary closure. The result showed that the open technique group significantly preserved the horizontal ridge dimension better (1.74 mm vs. 4.18 mm). In their three-armed RCT, Demetter et al. showed that 100% cancellous bone, 100% cortical bone, and 50%/50% cortico-cancellous FDBA resulted in similar outcomes in alveolar preservation procedures.

One randomized control trials compared a mixture of β -tricalcium phosphate and hydroxyapatite (TCP/HA) particulates plus CM and the blood clot plus CM. The first group has slightly better outcomes, but the differences are not significant (Nunes FAS, 2018). Lombardi et al found better results when he used nanoHA in the postextractional augmentation of a molar alveolus, but also without significant differences from spontaneous healing (Lombardi T, 2018).

Canellas et al. reported that using L-PRF (plasma-rich fibrin) in the post-extraction alveolus resulted in a smaller bone loss in width (0.93 mm) but also in height in the buccal part of the site (0.7 mm) compared to spontaneous healing (2.27 mm and 1.39 mm). In a four-arm RCT, the authors reported better results when they used A-PRF and A-PRF with FDBA, FDBA versus spontaneous healing. Preservation of the height was better obtained with FDBA and A-PRF with FDBA.

Jo et al. tests the effect of two recombinant morphogenetic bone protein -2 (rhBMP-2) (Jo DW, 2019). These proteins were introduced into TCP / HA particles and soaked absorbable collagen sponges with similar results in limited horizontal (0.57–1.1 mm) and vertical (0.08– 0.68 mm) bone loss.

The technique of cell repopulation with different materials to protect the blood clot was also studied, such as: hdPTFE sutured above the wound (2.9 mm and 3.3 mm) with significantly less vertical bone loss (0.12 mm vs. 1.6 mm). Jiang et al. uses a titanium stent above the alveolus with significant differences from spontaneous healing, reduced the horizontal ridge resorption (0.89 mm vs. 3.12 mm) and significantly more vertical bone resorption was reported at buccal bone with titanium (0.91 mm vs 0.51 mm) (Jiang X, 2017).

Table 1. Results of different study and methods of ridge preservation

Study	Methods	Control	Measurements	Δ width	Δ vertical
Lekovic et al. (1997)_2	Test: ePTFE [®] membrane,	No socket filling	surgery	2.6mm	0.7mm
Iasella et al. (2003)	Test: FDBA + tetracycline + collagen membrane	No socket filling	Clinical + stent	1.4mm	2.2mm
Fiorellini et al. (2005)_2	Test 2: 1.50 mg/ml rhBMP/ ACS	No socket filling	CT scan	2,7mm	1,15mm
Barone et al. (2008)	Test: Corticocancellous porcine bone + collagen membrane Control:	No socket filling	Reentry + stent	2mm	2.9mm
Aimetti et al. (2009)	Test: Medical-grade calcium sulphate hemihydrate	No socket filling	Reentry + stent	1.2mm	0.7mm

Crespi et al. (2009)_2	Test 2: Calcium sulphate Control: No socket filling	No socket filling	Periapical X-rays	-	1.27mm
Casado et al. (2010)	Test 2: bovineBMP+bOM+resorbable membrane	No socket filling	Clinical + stent	2,58mm	-
Oghli & Steveling (2010)	Test 2: Autogenous soft tissue graft + collagen matrix with gentamicin	No socket filling	Cast	0,2mm	-
Lim et al.	DBBM-C + CM	No socket filling	-	1.02mm	0.25mm
Cha et al.	DBBM-C + CM	No socket filling	-	5.27 mm	-
Canellas et al.	L-PRF	No socket filling	-	0.93mm	0,7mm
Clark et al.	A-PRF + FDBA	No socket filling		1.9mm	1mm

CONCLUSIONS

ARP procedures should always be considered to preserve the alveolar bone volume or to correct existing soft and hard tissue defects. Regarding the effectiveness of ARP procedures compared with spontaneous healing the majority of the studies showed significant either less horizontal or vertical ridge resorption. The 2-3 mm range in addition helped the clinician to avoid additional augmentation procedures like sinus augmentation, which in turn minimizes the treatment duration, cost, and complications. Based on the selected articles and systematic reviews it is hard to determine if one biomaterial is superior to others. Bovine and porcine xenografts, as well as allografts, seem to provide consistent, beneficial reduction in both horizontal and vertical ridge resorption. On one-part studies have shown that PET could be promising, but the requirement for strict case selection and surgical experience is high, but on the other part PET studies with good results and low complication rates were mostly from a few research teams. Other randomized control trials with large numbers of individuals are needed to provide more solid outcomes.

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The role of dental plaque disclosing agent in oral hygiene improvement among a group of institutionalized children



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Abstract

Oral hygiene is precarious among institutionalized children, because free treatments are only available subject to certain conditions and because they cannot be supervised while they brush their teeth. Material and methods: the study includes 31 subjects who were clinically examined for the determination of the oral hygiene level, and who filled out a questionnaire regarding their attitude towards the disclosing agents. Results: The average value of the DIS index prior to the application of the disclosing agent was of 1.12, with a 1.34 mean value post-application (satisfactory hygiene). The hygiene level improved with the use of the correct technique and the disclosing agent, with values between 0.1-0.6 (good oral hygiene). Conclusion: There are clear results in terms of change in the children's behaviour related to dental hygiene, supplemented by the improvement of the oral hygiene level following the removal of the bacterial plaque deposits revealed by the disclosing agents.

Keywords: disclosing agents, oral hygiene, disadvantaged children

INTRODUCTION

The World Health Organization places great focus on prevention in dental medicine and supports educational programs mainly addressing children and elderly [1,2]. According to the researches in the field, the oral hygiene of institutionalized children is precarious, with a high prevalence of oral diseases [2-4]. This could also be triggered by the fact that these children only benefit from free dental treatments subject to certain conditions and that, furthermore, they cannot be supervised and helped each time they brush their teeth.

Auxiliary dental materials, such as plaque disclosing agents, if correctly used, help improve the results of these educational programs, motivating the patients and helping them adapt their brushing technique to suit their specific needs [1,5]. The use of the plaque disclosing agents is the easiest and fastest method for the clinician to identify the bacterial plaque and diagnose the patient's oral hygiene level [1,6]. Thus, the use of the plaque disclosing agent amongst institutionalized children is even more important than in the case of other individuals.

The present study adopts an approach to an oral health topic, relying on the advantages of the dental plaque disclosing agents, with clinical applicability in the field of dental materials, prevention and community dentistry. Thus, the aim of this study is to assess the importance of using the disclosing agent for the information, motivation and development of the skills required for a correct brushing technique among a group of institutionalized children.

MATERIAL AND METHODS

A number of 31 subjects (19.4% males), aged between 7 and 19, from the foster care home of "Sfanta Maria" Community Service Complex, Valenii de Munte, Prahova, were included in this cross-sectional study, in May 2019. The consent of the children's legal custodian was obtained, and the study was conducted in the medical office of the centre.

The oral clinical examination was carried out using mobile units equipped with suitable lighting systems, provided by Colgate-Palmolive, with single-use consultation kits and using the proper protection equipment. Dental areas with bacterial plaque deposits were examined three times, under different circumstances, i.e.: after the brushing of the teeth by the child via the usual technique, through inspection and palpation with the dental probe; after the application of the plaque disclosing agent, and the third one, following the roll technique brushing (the subject received guidance in this respect, with explanations and demonstrations on models, after the incorrectly brushed areas were revealed by staining). Solution-saturated plaque disclosing swabs were used. The plaque disclosing agent was applied as follows: each participant was requested to rinse their mouth with water, after which the plaque disclosing agent was applied via repeated rolling onto the examined dental surfaces, while holding the swab with the dental tweezers; the subject was then asked to rinse again with water so as to remove the excess dye, after which the plaque deposits were examined, with a score set for each dental area depending on the distribution of the soft deposits [5]. The participants' oral hygiene was assessed using the simplified plaque index (the DIS index), by summing up the codes corresponding to the six examined dental areas divided by 6. The 6 examined areas were as follows: the vestibular surface of the upper first molars, upper right central incisor and lower left central incisor and the lingual surfaces of the first lower molars. The codes used were as follows: 0 - lack of soft deposits; 1 - soft deposits do not cover more than $\frac{1}{3}$ of the crown; 2 - soft deposits cover more than $\frac{1}{3}$ of the tooth; 3 - soft deposits cover more than $\frac{2}{3}$ of the tooth crown surface. The DIS index values were interpreted based on the following classes: excellent hygiene (index value equals 0); good

hygiene (0.1 to 0.6); satisfactory (values ranging between 0.7 and 1.8); dissatisfactory (values ranging between 1.9 and 3) [5].

Finally, a questionnaire was applied, including questions on the children's perception and attitude towards the use of the dental plaque disclosing agent, and in the end, the participants received fluoride toothpastes and toothbrushes.

RESULTS

The mean age of the subjects was 13.26 years ($SD \pm 2.76$) and 80.6% of them were females.

Clinical examination results

The clinical examination has revealed a prevalence of deciduous dentition for 20 of the subjects (64.5%), while the remaining 11 children have mixed dentition. Most of the children included in the study are right-handers (93.3%).

Two measurements of the plaque index were performed, in order to assess the clinical implications of the use of the plaque disclosing agent during the dental examination. The measurement relied on the values obtained following the examination of the plaque deposits by inspection and palpation with the dental probe, while the second examination consisted of the inspection of the bacterial plaque dental areas stained by the disclosing agent.

In the first case, where the bacterial plaque deposit dental areas were examined by inspection and palpation of the dental surfaces with the dental probe, the results obtained were lower as compared to the values derived from the second examination.

The average value of the plaque index as assessed prior to the application of the disclosing agent was of 1.12, with a 1.34 DIS mean value post-application, denoting satisfactory hygiene (Table I).

Table I. Mean, minimum and maximum values of the DIS index, depending on the method of evaluating oral hygiene, with or without the disclosing agent

DIS index	Mean	Standard deviation	Minimum	Maximum
Without stain	1.12	0.58	0.16	2.50
After dye	1.34	0.50	0.5	2.33

In the case of the plaque index assessed without staining, the lowest and, respectively, the highest value were identified in only one child. The most frequently calculated were of 0.75, 1, 1.5 and 1.66. None of the subjects had excellent oral hygiene upon the first 2 examinations.

For the index assessed after the application of the plaque disclosing agent, the most frequent score was of 1.33 (16.1%) and 1.66 (12.9%). 20 children had satisfactory hygiene, 8 had good oral hygiene and only 3 had a dissatisfactory level.

The relevance of the bacterial plaque disclosing agent in terms of motivating and changing the behaviour with regards to the oral hygiene technique was assessed. Thus, two measurements of the DIS index were performed. The first one relied on the scores obtained following the examination of the subjects after the usual brushing, and the second one relied on the scores obtained after the examination of the subjects who performed the brushing after being taught the correct technique (with explanations, demonstrations, and disclosing agent staining). Lower DIS index values were obtained in the case of the measurements performed after the application of the newly learnt technique. The mean value of the DIS index measured after the use of the usual brushing technique was 0.80 higher than the mean value obtained following the roll technique brushing (Table II).

Moreover, an improvement in the hygiene level was observed, with the use of the correct technique and the disclosing of the plaque, with an DIS index of 0.1-0.6, good oral hygiene. The results show an excellent oral hygiene level for 5 of the subjects.

Table II. Mean, minimum and maximum values of the DIS index, depending on the toothbrush method

DIS index	Mean	Standard deviation	Minimum	Maximum
Usual brushing technique	1.34	0.50	0.5	2.33
Rolling technique after disclosing agent	0.54	0.55	0	2.50

Table III shows the mean values of the plaque indexes according to the variables considered: gender, the child's hand dominance and type of dentition. It was observed that females, subjects with a left dominant hand and those with permanent dentition have lower tooth decay indexes and, hence, a higher oral hygiene index as compared to males, right-handers and the ones with mixed dentition, but the differences are not statistically significant.

Table III. Mean values of dental plaque index related to characteristics of the subjects

DIS index	No staining Mean (SD)	With disclosing agent Mean (SD)	After rolling technique and dental plaque agent Mean (SD)
Female	1.01 (0.58)	1.33 (0.55)	0.45 (0.43)
Male	1.58 (0.33)	1.37 (0.29)	0.93 (0.79)
Right handed	1.13 (0.60)	1.38 (0.49)	0.56 (0.55)
Left handed	0.97 (0.46)	0.99 (0.59)	0.36 (0.42)
Permanent dentition	0.82 (0.43)	1.15 (0.42)	0.47 (0.59)
Mixed dentition	1.67 (0.38)	1.68 (0.47)	0.68 (0.42)

Results obtained following the application of the questionnaire

The subjects were asked whether they enjoyed the application of the plaque disclosing agent, and most answered positively (96.8%), only one of them replying negatively. This result shows that the plaque disclosing agent used fulfils the taste, smell, colour criteria, so that it generates a pleasant experience when used.

Regarding the use of the staining in order to highlight the areas where the hygiene was not correctly performed, 28 children replied affirmatively (90.3%).

Most children managed to identify the bacterial plaque deposits with the help of the disclosing agent, focusing on the stained dental areas.

Children manifested interest in the use of this dental material. This was actually highlighted by the participants' answers to the questionnaire: when asked if they are willing to use the staining agent again, they all replied affirmatively.

DISCUSSIONS

The values of the second bacterial plaque measurement were different from the first one. The contrasting colour of the bacterial plaque as compared to the dental surfaces, obtained following the use of the plaque disclosing agent, facilitated the examination, the bacterial plaque being easy to detect and quantify. Moreover, the plaque staining was extremely useful to motivate and raise awareness among the subjects on their dental hygiene level.

The choice of the brushing technique took into account the age of the children, their vague knowledge on the correct brushing technique, as well as the fact that the children are most often not supervised, helped or checked during daily dental brushing, considering that this is a group of institutionalized children. The roll brushing technique was chosen because it is efficient and recommended for children and people with a healthy periodontal tissues [5]. It should be mentioned that the subjects' periodontal assessment was not performed as part of this study, as this will constitute the subject of a future study.

The values of the oral hygiene index, measured following the dental brushing performed after the staining with the plaque disclosing agent were lower as compared to those of the index measured in the same individuals following their common brushing technique.

The results of this study, even though it was carried out on a restricted number of subjects, are also confirmed by other researches in the field.

In our country as well, it was highlighted that the oral hygiene of children in foster care homes is dissatisfactory [2,3,4]. In 2018, a longitudinal study monitored the evolution of the oral hygiene level in a group of children residing in a foster care home; a decrease in the values of the plaque indexes was noticed starting the very first month, a halving of the mean plaque index being observed after 4 months [7].

The literature currently includes both studies demonstrating the usefulness of the staining agent among patients, and studies stating that the oral hygiene level, despite being obviously enhanced, can also be influenced by other factors, thus minimizing the role of the disclosing agent [8]. The efficient removal of the bacterial plaque is associated to the level of oral hygiene knowledge, age of the subjects, motivation, frequency and duration of the brushing [8].

The use of the plaque disclosing agents is the easiest and fastest method for the clinician to identify the bacterial plaque and assess the patient's oral hygiene level [6,9,10,11].

The children were delighted with the plaque disclosing agent, which they found to be useful, even though, prior to the study, none of them had heard of such an ancillary material that can be used as part of the oral hygiene routine.

CONCLUSIONS

In so far, the plaque disclosing agents used have shown their usefulness. There are clear results in terms of the change in the children's behaviour with regards to dental hygiene, supplemented by the improvement of the oral hygiene level following the adequate removal of the bacterial plaque deposits revealed by the disclosing agents.

The dental plaque index values reveal a need for educational programs and the application of preventive and curative procedures among children, with a special focus on the institutionalized ones. If correctly used, plaque disclosing agents help improve the results of the educational programs, motivating the participants and helping them adapt their brushing technique to suit their specific needs.

The children's perception on the importance of the plaque disclosing agent is a positive one, stating that they would like to reuse it. Hence, the idea of recommending to the managers of this foster care home to either purchase, or obtain via sponsorships, dental plaque disclosing agents, as an auxiliary oral hygiene means for these children, as well as the return to this community with informative materials meant to educate them on oral hygiene and to reassess their oral hygiene level are encouraged.

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The management of the oral microbiom as an indicator of children's oral health



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Abstract

The human mouth is inhabited by several hundred species of viruses, bacteria, fungi and archaea that reside in complex, polymicrobial communities on at various sites in the mouth. Typically, this oral microbiome exists in homeostasis with the humanbody. Early life determinants of the oral microbiota have not been thoroughly elucidated enough. A major part of the maturation of the oral microbiome occurs during the first two years of life, and this development may be influenced by early life circumstances. Our goal in this chapter is to provide a large understanding of the strategies employed by oral bacteria and evidence for the formation of the oral microbiome during early childhood, the potential of using childhood oral microbiome to predict future oral and systemic diseases, and the control of the current evidence. We debate the factors that impact development of the oral microbiome and explore oral markers of disease, with a focus on the early oral cavity.

Keywords: oral microbiome, children, caries, streptococcus mutans, early childhood

INTRODUCTION

The oral microbiom constitute a complex, various and dynamic ecosystem, and its composition has been discussed in relation to oral health. However, recent studies have related the oral microbiome in childhood with dental caries, allergy and asthma diagnoses, weight gain trajectory, and autism spectrum disorder. These microbiomes can remain in mutualistic balance with the host or can become dysbiotic, or destructive to the host, resulting in increased risk of dental caries and gingivitis along with other more severe periodontal diseases [1].

The composition of the oral community responds to environmental changes, and through the addition of new species can mold the environment to its preferences rather than adapting to its surroundings [2]. The oral bacteria habitat find themselves in continually changing, with local fluctuations in pH, oxygen availability and temperature gradients, a constant flow of saliva and gingival crevicular fluid, as well as changes in immune effectors and nutrient availability.

The oral cavity serves an initial entry point for colonization of the oral and gut microbiota and therefore is an easily accessed body site for assessment of the microbial community, and biologic markers used to diagnose, predict, and monitor both oral and systemic diseases. Similar to reported associations between microbiome and adults' health, recent data suggest that disruptions in early oral colonization and establishment of a healthy oral microbiome may influence the progression of both oral and systemic conditions in children [3]. Despite that more longitudinal studies are critically needed to provide substantial evidence on causal relationship between the oral microbiome and oral health, health conditions that potentially have an oral microbial involvement and harbor oral microbial signatures include but not limited to children's tooth decay, infant weight gain, pediatric appendicitis and pediatric inflammatory bowel disease.

The mouth is not a homogeneous environment for the resident microbiota, but offers several distinct habitats for microbial colonisation, such as teeth, gingival sulcus, attached gingiva, cheek, tongue, lip and hard and soft palate. These oral habitats form a highly heterogeneous ecological system and support the growth of significantly different microbial communities [4]. The warm and moist environment in the mouth suits the growth of many microorganisms and offers host-derived nutrients, such as saliva proteins, glycoproteins and gingival crevicular fluid. The teeth are the only natural non-shedding surfaces in the human body and provide unique opportunities for extensive biofilm formation, and a secure haven for microbial persistence.

In this review, we try to analyze relationships between oral bacteria and health by exploring the factors that form the human oral microbiome, with a focus on the early oral cavity. We review studies on the oral microbiome of children and the ecological and developmental aspects of this microecosystem that relate to oral and systemic health. To accomplish these goals, we examine the factors impacting development and maturation of the oral microbiome since birth, explore biomarkers influencing oral health and disease in children and inspect how oral microbial markers affect health beyond the child's oral cavity into adulthood. Finally, we discuss the technical and analytical areas where the microbial ecology and clinical field should focus to translate biomarker discovery into preventive therapeutics in oral and systemic health in an individual's lifetime [5].

Aim and objectives

In this systematic review, we evaluate the management of the oral microbiom literature evaluating the possible link between oral health and the oral microbiome. Identifying individuals at higher risk for early dental caries relationships between oral

bacteria and health by exploring the factors that form the human oral microbiome, with a focus on the early oral cavity.

MATERIAL AND METHODS

Oral microbiome development during childhood

The development and structure of the neonatal microbiome have been partially clarified, with a main focus on the microbial population inhabiting the lower intestinal tract, while information about the oral cavity colonization following delivery is still limited [6]. Until now, no published longitudinal studies have characterized oral microbiota development during infancy and childhood with culture independent next-generation sequencing methodologies, particularly in association with tooth decay. It is believed that by production and excretion of metabolic products of pioneer colonizers (including facultative anaerobes *Streptococcus* and *Actinomyces*) acquired at birth and the following hours, the environment can be altered, thus benefiting and selecting the growth of other species (including more strictly anaerobic genera like *Veillonella* and *Fusobacteria*). As the baby grows, microbial communities develop and increase in microbial diversity [8]. During this period, the oral microbiota is characterized by high variability and current knowledge indicates that it reaches adult-like stability around 2 years of age.

The oral biofilm is composed of complex community derived from multiple species that transition from assemblages of individual organisms to stable communities. These stable communities in fact undergo fluctuations in bacterial composition in response to environmental and microbial factors. Community development and maturation is a complex process that is the sum of various synergistic and antagonistic interactions all occurring in oral community but the net effect is a stable polymicrobial environment that is more beneficial to the bacteria for nutrient acquisition and processing, protection from immune responses, and resistance to environmental stresses [7]. The bacteria within the oral community are able to sense and respond to each other by the production and detection of small chemical signals, secondary messengers, and metabolites.

Streptococcus mutans, the major etiological agent in dental caries, resides in the supragingival oral biofilm. *S. mutans* can efficiently metabolize carbohydrates to produce lactic acid, resulting in a pH reduction that causes demineralization of the enamel and dentin. Major virulence determinants of *S. mutans*, including adherence to hydroxyapatite surfaces and development of biofilms with acidic microenvironments [8].

Metabolic signaling

Within the subgingival biofilm, many bacteria are intimately associated with one or more physiologically compatible species. This close proximity facilitates the action of many of the signaling systems described here but also allows cooperative metabolism. Multiple studies have demonstrated metabolic communication in dual-species experiments. Metabolism may also have indirect benefits to other community members; the lactic acid utilizing *Veillonella atypica* and *A. Actinomycetemcomitans* could prevent the acidification of the oral biofilm, thus protecting the acid-sensitive organisms such as *P. gingivalis*. the relationship between *A. actinomycetemcomitans* and *S. gordonii* is a balance of synergistic cross-feeding and antagonistic interactions. It was demonstrated that *A. actinomycetemcomitans* spatially positions itself close enough to *S. gordonii* to benefit from the secretion of l-lactate, but far enough away for it to detoxify H₂O₂ through the production of catalase. Many other oral streptococci produce H₂O₂ in the oral environment and similar homeostatic mechanisms to maximize energy gains from metabolic cross-feeding while minimizing oxidative stress may be present in shaping the spatial organization of dental plaque [9].

There are decades of studies demonstrating enhanced growth among oral bacteria in addition to the few examples detailed here. Mutualistic metabolism and communication promote stability of the oral biofilm and reduce direct competition for nutrients among biofilm constituents [10]. Spatial and temporal arrangement of organisms in the complex polymicrobial community may also be a function of shared metabolism. A bioinformatics

analysis of metabolic pathways of 11 oral bacteria found a large metabolic redundancy in the community, and metabolic capabilities varied among organisms associated with specific layers of the biofilm. A recent metatranscriptomic analysis of periodontally diseased sites compared to patient-matched healthy sites revealed that metabolic capability was more stable during periodontitis than was species level diversity, suggesting the overall metabolic potential of the community may be more correlative with pathogenicity than species composition. This overall metabolic stability is likely due to shared environmental conditions and stresses; however, true biofilm homeostasis is a balance between this metabolic redundancy and metabolic cross-feeding.

If the metabolic capabilities and necessities of the community were too similar, individual species would be in constant competition for nutrients. However, the conservation of core metabolic functions and mutualistic metabolism between integral species reduces the antagonistic interactions and promotes community homeostasis[11].

Future studies will provide more insight into the complex web of cell-cell communication and signaling cascades utilized by oral bacteria to promote synergistic interactions. The oral biofilm is substantially more than the sum of its parts, with a community-dependent metabolic potential and a structure stabilized by interactions that promote survival of the community as a whole [12]. Current and future technologies will allow for a better understanding of these community-level interactions. Demystifying the languages of bacterial communication may ultimately lead to more fruitful development of preventative and therapeutic interventions for periodontal diseases [13].

Association of oral microbiota with obesity

Obesity in children is a major risk factor for future cardiovascular diseases, diabetes, gastrointestinal disorders, and dental diseases. A definite association of increased abundance of Firmicutes and lack of Bacteroides is related to central obesity. However, the association between oral microbiota and obesity has yet to be investigated.

Gram-negative bacteria such as *Porphyromonas gingivalis*, *Tannerella forsythia*,

Proteobacteria spp, *Campylobacter rectus*, *Neisseria mucosa*, and *Selenomonas noxia* have been detected in the subgingival film of obese individuals, and a four- to six-fold increase in *Proteobacteria* spp, *C rectus* and *N mucosa* has been reported in obese patients [14]. Nonetheless, differences in gut microbiota due to delivery mode might be erased by the mounting effects of other factors as early as six weeks after birth. Diet is one such factor. The gut microbiota differs between breast- and formula-fed infants, and the first year after birth also comprises other diet transitions affecting gut and oral microbiota. For instance, high-fat

high-carbohydrate diets have been associated with high and low infant gut microbiota F:B ratios, respectively [15].

Away from diet, antibiotics have been shown to influence weight. For instance, exposure to antibiotics in the first two years was associated with higher weight in later childhood. It was revealed that growth curves were negatively associated with the oral microbial diversity, and positively associated with the Firmicutes-to-Bacteroidetes ratio of the oral microbiota. The study results suggest for the first time that the association between the oral microbiota and the temporal pattern of weight gain in early childhood might be stronger and more consequential than previously thought and thus requires further characterization [16].

However, the mechanism underlying these associations remains unknown. In contrast to the oral microbiota, we found that a child's gut microbiota at age two was not significantly associated with weight gain during the first two years after birth. At first, this appeared surprising, as several studies have linked obesity to decreased diversity and increased Firmicutes-to-Bacteroidetes ratio in the gut microbiota [17]. However, while an increased Firmicutes-to-Bacteroidetes ratio is a common marker of obese gut microbiota described in several papers and reviews some studies found no change in Bacteroidetes, increased Bacteroidetes in overweight and lean individuals, or increased Firmicutes in lean patients after gastric bypass. Moreover, the obesity signatures of decreased diversity and increased F:B ratio may become pronounced only at later stages of gut microbiota development. This may suggest that the oral microbiota is established with potential signatures of obesity earlier than the gut microbiota. We also note that, despite the lack of significant associations between gut microbiota summary measures and growth curves (or binary weight gain outcome), we did find specific gut taxonomic groups associated with early childhood weight gain. It was identified a Bacteroidetes group and three Firmicutes genera groups in the gut as positively associated with children's growth curves [18,19]. These could be pioneers in setting up changes leading to a dysbiosis of gut microbiota associated with increased weight – a hypothesis that should be investigated in future studies.

We identified several bacterial genera that were associated with child growth patterns. These results suggest that by the age of two, the oral microbiota of children with rapid infant weight gain may have already begun to establish patterns often seen in obese adults. They also suggest that the gut microbiota at age two, while strongly influenced by diet, does not harbor obesity signatures many researchers identified in later life stages [20].

Health implications in children's oral microbiome

The oral microbiome remains its stability over time in healthy individuals, despite subjected to a variety of host and environmental challenges. The distinct oral microbial community is associated with a series of oral and systematic diseases. Although a majority of studies are cross-sectional or case-control designed, with small sample sets which are incapable of establishing causative relationship between oral microbiome and diseases, changes in the characteristics of the oral microbiota may provide correlative insight and projection into the onset, progression, and recurrence of human diseases [19].

Oral microbiome and early childhood caries (ECC)

The microbial etiology of ECC is linked with poly-bacterial infection of teeth. Normally, *S. mutans* is considered as a prime guilty for ECC due to its acidogenicity, aciduricity and ability to form extracellular glucans. Although at very low levels, *S. mutans* was detected in the oral cavity of the infants in early infancy, even before tooth eruption; with a trend of the increasing amount with the presence of teeth and notably higher in children with ECC[21]. Longitudinal studies have demonstrated the predictive power of using *S. mutans* to predict ECC risk. In addition to *S. mutans*, several studies have characterized the oral microbiota in caries-active children, and have identified additional species that are associated with caries including *S. salivarius*, *S. sobrinus*, *S. parasanguinis*, *S. wiggsiae*, *S. exigua*, *L. salivarius*, *Porphyromonas*, *Actinomyces*, and *Veillonella*. It was compared the plaque samples from 36 severe ECC (S-ECC) and 36 caries-free (CF) children with a mean age of 23.6 months and monitored the microbiota evolve during the onset of S-ECC. It was confirmed that *S. mutans* was the dominant species in many, but not all children with S-ECC. Among children without past caries history, *Veillonella*, not *S. mutans* or other acid-producing species, were found to be a predictor for future caries. The levels of *Veillonella* highly correlated with total acid-producing species [18,21].

The underline explanation of the phenome lies in that Veillonella is well-known for metabolizing lactate; lactate, in turn, is an end-product from the carbohydrates-derived catabolism by Streptococcus species that many of them are associated with caries. An inspiring way to elaborate is that Veillonella might not be acting as a criminal for causing caries, just a partner for caries. On the contrary, with the occurrence of caries and advancement of caries stages, the abundance of specific taxa reduced, for instance, Streptococcus mitis group, Neisseria and S. Sanguinis [22].

In concert with the different abundance of cariogenic and symbiotic bacteria in caries and healthy children, community diversity was also reduced in children with caries as compared to their healthy counterparts. The study results suggest for the first time that the association between the oral microbiota and the temporal pattern of weight gain in early childhood might be stronger and more consequential than previously thought, and thus requires further characterization [23]. However, the mechanism underlying these associations remains unknown.

CONCLUSIONS

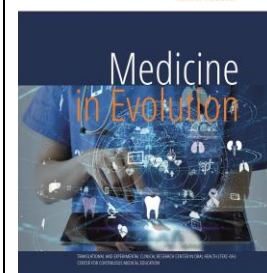
The role of dentists in the diagnosis, therapy, and management of ECC patients is fundamental. Dental decay is one of the most prevalent chronic diseases worldwide. A variety of factors, including microbial, genetic, immunological, behavioral and environmental, interact to contribute to dental caries onset and development. Oral microbiota composition varies in normal individuals from birth until adulthood because of various intrinsic and extrinsic factors. Some common factors contributing to tooth decay include biological makeup, behavior, environment, and lifestyle.

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External staining procedure in posterior direct restorations



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Abstract

The main purpose of direct restoration procedures is to obtain a natural aspect of the restored tooth. The modern restoration materials (direct composite resins) offer this possibility, through their large amount of shades and opacities. More than ever, nowadays the use of pigments in dental medicine has become very usual, due to the increasing demand of the patients for aesthetic restorations. The external staining procedure consists in placing of the pigment on the tooth surface, after the tooth morphology is finished. This paper shows the aesthetic potential of dental pigments to restore the natural appearance of the posterior teeth, using the external staining procedure. Although the staining procedure is time consuming, it offers much satisfaction not only to the patient, but especially to the dentist. Good knowledge of direct composite layering techniques and dental morphology is necessary, in order to obtain a good result.

Keywords: external staining procedure, posterior direct restorations, dental aesthetics

INTRODUCTION

The patient of the 21st century, well informed, wants dental restorations that are both functional and aesthetic.

Modern direct restoration techniques have as main objective to obtain a more natural appearance of the tooth, a possibility offered by current restoration materials (composite resins). These materials come in a wide range of shades and opacities, which gives them the advantage of imperceptible restorations.

Dental pigments are increasingly used at the moment in the dental office and are aesthetic, light-curable materials that help to imitate the natural teeth. Pigments are important elements in direct dental restorations of composite resins. The most frequent used dental pigments are white, dark brown, ochre, blue. The need to use pigments is determined by the possibility of obtaining imperceptible restorations, which should be confused with the natural tooth. They can be applied over the composite resin or mixed with it, to produce certain effects on the restorative material. They can be applied in ditches, pits, dimples and even at the cusp slopes of the posterior teeth or the vestibular or oral surfaces of the anterior teeth. [1,2]

There are many staining procedures [1]:

External staining. This technique is performed after applying the last layer of composite, after performing the occlusal morphology.

The internal pigmentation technique consists in the use of pigments when performing the occlusal morphology, after the application of the last dentin layer of composite.

The technique of material shade changing. This technique involves the mixing of dental pigment with the composite resin material, to change its shade, followed by the application of the final material on the tooth, its modelling, then lightcuring, finishing and polishing.

Aim and objectives

The purpose of this paper was to highlight the importance of using pigments to restore the natural appearance of teeth in the lateral area, in direct restorations, using the external staining procedure.

MATERIALS AND METHODS

This paper presents a case report that underlines the aesthetic potential of the dental pigments used in direct restorations.

The patient (female, 24y) came into dental office, accusing sensitivity at tooth 1.5 (which had a direct occlusal-distal restoration with overflowing edges and a carious lesion) (Fig.1)

The therapeutic decision consisted in the direct restoration of the tooth 1.5, using external staining procedure.

Both carious lesion and direct occlusal-distal restoration were removed; then followed the finishing of the walls of the resulting cavity (Fig.2) and making of adhesive substrate of the restoration. A piece of Teflon tape was applied on tooth 1.6, to protect it. Orthophosphoric acid 37% was applied on the tooth 1.5 for 30 seconds (Fig. 3), after which it was removed with a jet of water and the tooth was dried. The dental surface was conditioned with adhesive (Single Bond Universal, 3M ESPE), followed by lightcuring for 20 seconds (Fig.4).



Figure 1. Initial situation of tooth 1.5



Figure 2. Finishing of cavity wall



Figure 3. Acid etching with orthophosphoric acid 37%



Figure 4. Applying of Single Bond Universal (3M ESPE)

The desire was to transform the second class cavity into a first class cavity and to create a contact surface. In this sense, a preformed matrix was used, interdentally immobilized with a wooden wedge and flow (Estelite Asteria, Tokuyama Dental) (Fig.5).



Figure 5. Restoration of the tooth 1.5 distal wall



Figure 6. Aspect of the restoration- oblique layering technique

The direct restoration of the tooth was performed with direct composite resin (Estelite Asteria, Tokuyama Dental). One applied the oblique layering technique, with layers of maximum 2 mm thickness (Fig. 6). In order for the restoration to imitate a natural tooth, a drop of dark brown dental pigment was used in the central groove, meant to give a natural appearance of tooth (Fig.7).

After application of the pigment, the excess was removed with an applicator and lightcured for 30 seconds. The final appearance is that of a tooth with a small staining on the occlusal surface (Fig. 8).



Figure 7. Application of dark brown dental pigment in the central groove of tooth 1.5 with a k-file needle # 06



Figure 8. The final appearance of the tooth, after the application of the dental pigment

After removing the rubber dam foil, the dental contacts were checked, using 40 microns paper. Then followed the surface polishing of the tooth 1.5.

The restoration of the tooth 1.6 will be performed in another appointment.

RESULTS

The final appearance of the tooth 1.5 (Fig.11) is highlighting the aesthetic potential of dental pigments.



Figure 10. The initial aspect of tooth 1.5



Figure 11. The final appearance of tooth 1.5

DISCUSSIONS

Aesthetic dentistry represents the perfection of restorative dentistry. Attempts to achieve this goal are often frustrating and color mismatch or improper matching is a factor responsible for many failures. Color matching is a very important criterion for achieving an aesthetic restoration, and improving its knowledge is possible with the study of tooth anatomy and surface morphology. [3,4]

From the point of view of the medical act itself, the pigments are not necessary in the restoration of the posterior teeth, but they improve the aesthetic aspect. Staining procedure define better the 3D perception of dental morphology. The intensity of the dark brown pigment should be carefully chosen. [5]

CONCLUSIONS

The use of dental pigments has gained importance in recent years, managing to meet the high aesthetic demands of patients.

Some doctors might consider this procedure a waste of time and useless; others opine that beauty lies in the details, that the use of pigments in dental aesthetics gives direct restorations that natural, imperceptible look that any restoration should have.

Nevertheless, these pigmentation techniques develop the artistic part of dental profession, the accuracy of workmanship and train the sense of observation of details and last, but not least, the aesthetic sense.

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How to perform the stamp technique



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Abstract

Aim and objectives: The role of choosing a direct technique in the posterior side as a stamp or layered has not been widely reported. The intent of the thesis is to gain an understanding of when to perform one technique or another in different classes by looking at the advantages and disadvantages to compare the predictability of the aesthetics results and the biomimetics of the restoration.

Material si methods: The patient, a 23-year-old girl, presented at the private praxis with blackish staining on the teeth in the posterior side and no complaints of discomfort. She needs odontotherapy treatment on the mandible in multiple teeth on the posterior side by using two different techniques stamp and layered.

Results: Precision is needed for the clinical step and high importance must be given to materials that become highly sensitive during handling.

Conclusions: The decision of choosing a technique that have been used depends on the desired aesthetic patients complaint, the time available for the operative steps, and the clinician's experiences with the technique and materials, or even depending on each clinical case, if it is involved just the enamel or enamel/ dentine.

Keywords: precision, aesthetics, technique, material.

INTRODUCTION

In the last 20/25 years, it changes the way how to treat dental decay, especially for the needs of the patients even for the aesthetics and toxicity demands that other material could give. For this, it was developed new material and method for the aesthetic restoration in the posterior side that is in continuous evolution. We can restore small or wide lesions with adhesive techniques. (1)

Some posterior teeth can present a lesion with intact anatomical morphology which allows us to perform a stamp technique, and other posterior teeth can present a deeper lesion more than 2 mm, so more complex because of the location and we need to perform a layered technique. The use of correct layering techniques allows us to give an aesthetic appearance that is to be first of all functionally correct. (2)

This research would consist of a general section that outlines the technique and their effectiveness in improving the treatment's prognosis, followed by an experimental area, demonstrated by the picture the comparison of two techniques when to use one another with the following advantages and disadvantages. (3)

MATERIALS AND METHODS

The patient, a 23-year-old girl, presented at the private praxis with blackish staining on the teeth in the posterior side and no complaints of discomfort. She needs odontotherapy treatment on the mandible in multiple teeth on the posterior side by using two different techniques stamp and layered. (Figure 1)



Figure 1. Initial situation (4.6)

The “stamp technique” is a new technique that reproduces both function and aesthetics. This technique is done by making an occlusal impression that records the occlusal morphology of posterior teeth before the preparation of the cavity is performed. After that is obtained an index, is then pushed against the last composite layer before light curing to achieve a positive reproduction of the anatomical tooth morphology. The only situation in which this technique is made is when the tooth has perfect anatomical features. This means that the stamp technique could restore hidden caries not really visible.

The isolation of the operating field is done by the checking of occlusal contacts, interproximal contacts with floss, anesthesia, and application of the rubber dam (Figure.2,3,4,5). The cavity preparation is made of cylindrical or round burs, a medium-grained diamond with a high handpiece (Figure.6), after the removal of carious lesion dentin

with round burs in carbide tungsten with a low handpiece and manually with a small curette, and the edge finishing with chamfering-regularization of the enamel is made with flame or cylindrical Arkansas burs with low handpiece.



Figure 2. Isolation



Figure 3. Impression with fluid composite and light curing the composite



Figure 4. Composite impression index

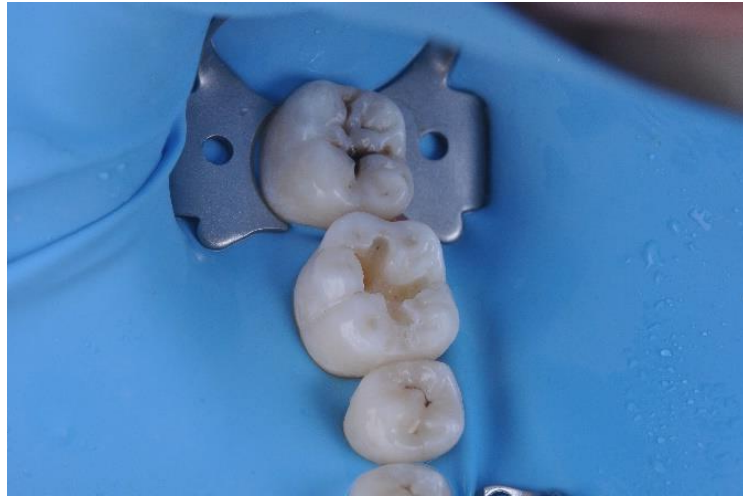


Figure 5. Cavity preparation



Figure 6. 1st layer of composite (light cured)



Figure 7. Final aspect

A single coat of vaseline which acts as a separating agent, was applied into the occlusal surface with an applicator brush tip, then a small amount of flowable composite material (Estelite Sigma Quick Flow, Tokuyama dental) was placed on the occlusal surface of the affected tooth, and an applicator brush tip was immersed into this composite, and the composite was cured.

Furthermore, cavity preparation was done, and selective etching rinse and dry then bonding was performed, a bit of flowable composite material was inserted as a liner (Estelite Bulk Fill Flow, Tokuyama dental).

On the last increment, a Teflon band is added, then the composite impression is placed over it, gently not to snap. It is forced lightly over the Teflon, making out that it is perfectly set until it is extracted. First, any extra content is removed, then the Teflon band.

The use of teflon is a good choice as it does not expire, is cheap, nonadhesive, and simple to discover. For the reproduction of the anatomical morphology of tooth the composite (Estelite Asteria OcE, Tokuyama dental) was light cured after the placement of the occlusal stamp on the tooth surface, and color pigmentation was used in the grooves (Estelite Color ocher syringe, Tokuyama dental), in the end, polishing was performed.

RESULTS

If the stamp technique is achieved, the total time is reduced and the post-restoration, finishing time is reduced due to the almost immediately desirable successful cusp-fossa relation.

This is useful for occupied clinicians and assists with improving their standing among the patients.

At that point, the level of porosities present in the last rebuilding is significantly diminished, this is since the stamp technique applies tension on the composite, consequently diminishing the development of air bubbles of the last layer of composite.

Precision is needed for the clinical step and high importance must be given to materials that become highly sensitive during handling.

Result may be jeopardized if the clinician does not control each layer.

DISCUSSIONS

Primary carious lesions in posterior teeth may have an unaffected morphology even if there is an inadequate DEJ.

The dentin beneath the enamel is destroyed when there is a bit or no damage to the enamel. In order to access the necrotized dentin, enough healthy enamel must be removed.

As a result, the normal anatomy of the tooth that existed previously is lost. The idea of using a composite stamp technique exists for this purpose.(4)

The detection of dental decay has decreased in the recent years due to the contributing factors as the use of fluorides, mostly regarding carious lesions on the surfaces.

However, the widespread use of fluoridated agents indicates that the morphological element in the production of dental decays has shifted, leading to an increase in the occurrence of caries lesions where the enamel remains intact.(5)

The stamp technique is a suitable option for the reconstructions of the occlusal aspect in the posterior side. The use of composite material allows for the construction of perfect cusp profiles and morphology, which achieve occlusal contact and the operator time.(6)

Dentists are active in the treatment of patients' occlusions as well as regular repair procedures.

Premature contacts may alter the occlusal location, leading to malocclusion and altering the movement of the mandible.(7)

One downside is that this technique takes ability to be done correctly.

CONCLUSIONS

The decision of choosing a technique that have been used depends on the desired aesthetic patients complaint, the time available for the operative steps, and the clinician's

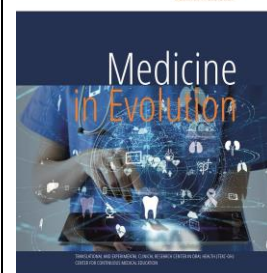
experiences with the technique and materials, or even depending on each clinical case, if it is involved just the enamel or enamel/dentine.

Although the technique is sustained by scientific evidence, there seems to be a trend toward simplification of steps, benefits being less treatment time and reduced polymerization contraction stress.

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Laser diode applications in pre-prosthetic periodontal treatment – clinical case



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Abstract

Aim and objectives: The purpose of pre-prosthetic periodontal treatment using laser diode is to stop the inflammatory process by reducing microorganisms. In this study, we aimed to evaluate the effect of diode laser treatment on a patient with gingivitis.

Materials and methods: Clinical case presented is of a female patient who addressed the dental service for a total prosthetic rehabilitation. At the upper jaw, the patient had generalized gingivitis at the abutment teeth. After SRP, non-surgical periodontal instrumentation was applied, with the adjuvant use of diode laser, with a wavelength of 980 nm.

Results: Two weeks after starting the treatment, the gingival index (GI) was evaluated, and it was decided that the prosthetic treatment itself could be started, the gingival inflammatory phenomena being remitted.

Conclusions: The 980 nm laser diode can be used as an adjunctive therapy to cure gingivitis.

Keywords: diode laser, gingivitis, pre-prosthetic periodontal treatment

INTRODUCTION

Periodontitis is a chronic inflammatory disease caused by a bacterial infection [1]. It is manifested in the supporting tissues of the tooth on the arch: gum, periodontal ligament, alveolar bone [1,2]. Gingivitis is a common and mild form of gum disease (periodontal disease) that causes irritation, redness and swelling (inflammation) of gingiva around the base of the teeth. The main goal of periodontal therapy is the elimination of bacterial deposits and periodontal pockets by removing the supragingival and subgingival biofilm [3]. Scaling and root planning (SRP) is the common approach in the control of inflammation in non-surgical treatment modality, but conventional treatment fails in many situations especially in severe cases [4,5].

Every specialty area of dentistry is utilizing the powers of laser energy for therapeutic purposes. The diode laser, with wavelengths ranging from 810 to 980 nm in a continuous or pulsed mode, is the most popular soft tissue laser and commonly used in dentistry [6-9]. The diode laser has become an important tool in dentistry due to its ease of use and affordability. It has advantages with regard to periodontal treatment [10,11]. It is well absorbed by melanin, haemoglobin, and other chromophores that are present in periodontal disease [12].

The diode laser acts on unhealthy gingival tissue. The laser energy is transmitted through a thin fiber (300-400 μm diameters) that can easily penetrate into deep periodontal pockets to deliver its therapeutic effects. Laser applications in periodontology are: soft tissue surgical applications; bacterial reduction; removal of the pocket epithelium; laser root conditioning; implant therapy.

The use of diode laser in the treatment of chronic periodontitis is based on the benefits of subgingival curettage, the new laser-induced attachment by regenerating the cementum, periodontal ligament and supporting the alveolar bone. By using it, a significant reduction in the number of subgingival pathogenic bacteria is obtained [13-15].

Aim and objectives

The purpose of pre-prosthetic periodontal treatment using laser diode is to stop the inflammatory process by reducing microorganisms. In this study, we aimed to evaluate the effect of diode laser treatment on a patient with gingivitis.

MATERIAL AND METHODS

Clinical case presented here is of a female patient who addressed the dental service for a total prosthetic rehabilitation. After clinical and radiological examination (Figure 1), we obtained the patient's informed consent to the treatment plan. In the first step of treatment, we decided to extract all mandibular teeth (Figure 2). At the upper jaw, the patient had generalized gingivitis at the abutment teeth (Figure 3).

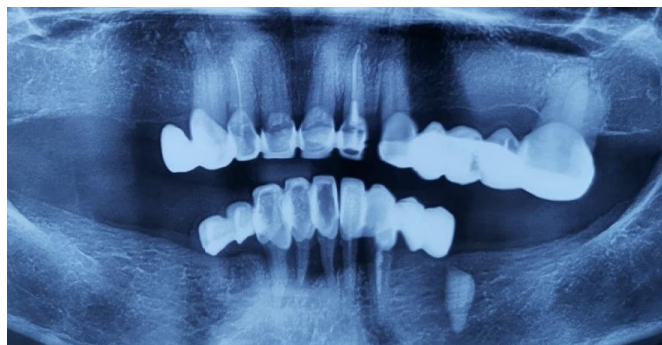


Figure 1. Orthopantomography of the patient



Figure 2. Initial clinical appearance in the upper jaw



Figure 3. Clinical appearance after removal of the fixed prosthesis from the upper jaw, with generalized gingivitis at the abutment teeth

After removing the fixed maxillary prosthesis, we evaluated the teeth in terms of periodontal support, and it was decided to extract the tooth 27. The final prosthetic treatment will consist of a mobilizable prosthesis at the level of the maxilla and a mobile prosthesis at the level of the mandible.

Prior to fixed maxillary prosthetic treatment, the periodontal inflammation index must be reduced. A non-surgical periodontal treatment protocol was adopted (NSPTP) consisting of three meetings within a week (on the first, fourth and seventh day). After scaling and root planning (SRP) non-surgical periodontal instrumentation was applied, with the adjuvant use of diode laser, with a wavelength of 980 nm. The gingival groove was irrigated with Glucosite gel and Methyl blue, and sulcular debridement was performed (Figure 4), followed by biostimulation using diode laser (Figure 5).

Each treatment session ended with adhesive periodontal dressing based on cellulose, Reso-pac (Figure 6). This keeps out bacteria and assists the healing process. The patient was explained the importance of maintaining rigorous hygiene.



Figure 4. Irrigation of the gingival groove with Glucosite gel and Methyl blue; and diode laser sulcular debridement



Figure 5. Biostimulation using diode laser



Figure 6. Treatment with adhesive periodontal dressing based on cellulose, Reso-pac

RESULTS

Two weeks after starting the treatment, the gingival index (GI) was evaluated, and it was decided that the prosthetic treatment itself could be started, the gingival inflammatory phenomena being remitted (Figure 7).



Figure 7. Clinical appearance two weeks after starting the treatment for gingival inflammation

DISCUSSIONS

There are numerous studies on the effect of diode laser therapy on periodontal pockets in terms of its bactericidal effect and the improvement of periodontal condition.

In a study conducted by Assaf et al. using a diode laser in combination with ultrasonic scaling for the treatment of gingivitis, the authors demonstrated a significantly lower incidence of bacteremia in the diode + ultrasonic group (36%) compared to the ultrasonic only group (68%). They also suggested that diode lasers may be used to prevent bacteremia, especially in immunocompromised patients [16].

Kamma et al. studied the effect of using 980 nm diode laser in the treatment of aggressive periodontitis, demonstrating that it is possible to reduce the bacterial load in pockets without use of any systemic antibiotic therapy [17].

Some studies in patients divided into groups (laser and control group) showed that bacterial reduction with laser diode therapy was significantly better [18,19], others showed that laser therapy does not have a significant effect on the manifestation of inflammation in marginal external surface of the gum [20,21].

CONCLUSIONS

Laser diode therapy, in combination with SRP, supports the reduction of gingival inflammation by eliminating bacteria.

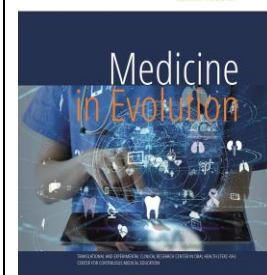
Although there is controversy about the efficiency and cost-benefit of using lasers, there are substantial benefits of using a diode laser, such as reduced pain, hemostasis, and improved patient comfort. Thus, diode lasers can rather be considered an advantage in periodontal treatments.

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Interceptive treatment with elastodontic appliance: case report



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Abstract

Purpose: Aim of this report is to describe a case of a patient with mixed dentition, dento-skeletal class II malocclusion, deep bite and increased overjet. The objectives of treatment were to correct the dento-skeletal malocclusion, to obtain a correct overbite and overjet, to control the permanent teeth in a good eruption and to improve aesthetical conditions.

Materials and Methods: Treatment plan for a female patient with class II division 1 malocclusion with mixed dentition included interceptive treatment with two elastodontic appliances Myobrace® K1 and K2.

Results: In this case, it shows that the use of the elastodontic interceptive appliance series shows a significant change in class II division 1 malocclusion.

Discussion: Various authors present solved clinical examples and recommend the use of elastodontic appliance in non-extraction malocclusion patients with permanent canines and bicuspid at the onset of eruption to treat overbite and overjet issues of any severity.

Conclusions: Early orthodontic diagnostic and treatment is important to guide dentitions during the development of a functional and morphological occlusion

Keywords: elastodontics appliance, deep bite, interceptive therapy

INTRODUCTION

The major concern in the advancement of proper occlusion is proper dentition development and growth.[1] Early orthodontic therapy has the goal of guiding dentitions as they form a functional and morphological occlusion. [2] Children under the age of six have a lot of bad behaviours that they can break on their own (spontaneously). If these unhealthy practices continue after the age of six, children may develop malocclusion. Oral myofunctional therapy is one of the therapies for malocclusion in paediatric dentistry (OMT). [3] The Myobrace appliance is one of the myofunctional device that may be used to address malocclusion and poor behaviours in children. Myobrace is an intraoral removable appliances comprised of silicone elastomer, used in interceptive orthodontics to correct malocclusion in children.[4] The appliances are basic in design and function, easy to use, and safe. [5]

The following statistically significant changes occur when Class II malocclusion is corrected using eruption guiding appliances: increase in lower anterior and total anterior face height, increase in mandibular growth and degree of mandibular protrusion, lingual tipping and retrusion of the maxillary incisors, increased mandibular molar mesial drifting and mandibular posterior dentoalveolar height, protrusion of the mandibular incisors, improvement in maxillo- mandibular and molar relationships, inhibition of the vertical development of the maxillary incisors, decrease in overjet and overbite. [6]

Aim and objectives

The purpose of this study is to describe the benefits of using myofunctional appliances to treat a patient who had a skeletal and dental class II division 1 malocclusion, a significant deep bite, retrognathic profile, increased overjet and overbite. Using this appliance, the problem was solved during mixed dentition.

MATERIAL AND METHODS

The subject, S.M., a 8 year old Caucasian female, was selected in our clinic. Nothing remarkable showed in her medical history. The patient's face was symmetric low retrognathic profile. Clinical examination showed right and left class II molar relationship, coincident midlines, no crowding in mandibular arch, increased overjet, deep bite.

Extraoral examination showed convex facial profile with posterior divergence of the face due to retrognathic mandible. Lips were potentially competent and protrusive with 6 mm of interlabial gap, everted lower lip, and hypotonic upper lip.

In this clinical situation the objectives for the treatment were:

- to treat class II malocclusion;
- to control bicuspid and canines eruption;
- to obtain a correct overbite and overjet
- to improve the profile;
- to maintain long-term clinical results.

The first stage of the treatment plan included the use of MYOBRACE K1® appliance (size medium). In the accommodation period, the first month of treatment, the appliance was used for 30 minutes in the first 7 days, and gradually, adding 30 more minutes each week of this period. The patient is instructed to bite into the appliance and keep his lips firmly closed. After the first month, the active phase of the treatment begins, the appliance is used by the patient for 1-2 hours per day, and as much as possible during the nighttime (preferably for 8-10 h). During this period the patient was controlled every month. This phase is recommended

for the first year of usage. After this first year, the patient used the device only at nighttime consisting of a stabilising phase, for six months.

After the first year and a half, the patient was re-evaluated. We decided it was needed to continue the orthodontic treatment using the successive appliance (K2 ®), for the arch expansion and to promote the position of the tongue and improve the lip seal. The patient was controlled regularly every month.

RESULTS

Correction of class II division 1 malocclusion with increased overjet, and deep bite can be detected in the analyzed case, which is connected with satisfactory aesthetic outcomes of soft tissue profile along with lip competency. (Figure 1)



Figure 1. Face, smile and profile before and after treatment

Clinical occlusion research indicates an excellent treatment of dental class II division 1 malocclusion, overjet, and overbite being associated with satisfactory posterior tooth eruption. (Figure 2)



Figure 2. Occlusion in right lateral, frontal and left lateral view before and after treatment

After three years of therapy, the patient has proper intercuspidation, no crowding, normal overjet and overbite, right and left class I canine and molar.

DISCUSSIONS

One of the fundamental goals of pediatric dentistry is to aid in the normal development of teeth and occlusion. [7]

The current study looked at the efficacy of interceptive orthodontic treatment with an elastodontic appliance in participants who had particular early symptoms of malocclusion (mixed dentition stage). The overbite was addressed in the instance treated with Myobrace K1 and K2® appliances: the forces produced into the appliance are orthopedic and create 150 to 600 pounds per square inch in the upper jaw.[8]

Both skeletal and dentoalveolar alterations contributed to the malocclusion's resolution, indicating that elastodontic appliances might be a comprehensive early treatment strategy.

These findings may corroborate earlier research suggesting that one phase of elastodontic therapy followed by a long retention period, encompassing adolescence, is a viable alternative to the traditional biphasic strategy of a functional device followed by fixed appliance therapy. [9]

In terms of dentoalveolar consequences, the patient had a regulated eruption of the maxillary incisors, which prevented future overeruption, as well as the eruption of the posterior teeth at the same time.

The same process, in conjunction with the anterior sloping plane for mandibular advancement, provides a force-system in the lower arch that causes vertical control associated with incisor protrusion and molar mesial advancement.

In subjects with class II division 1 malocclusions, the combined effects on the two arches result in the correction of the molar relationship, as well as the decrease of the overjet and improvement of the overbite. [10]

The soft and elastic material of elastodontic appliances is an exciting invention since it enables for myofunctional exercises to rebalance the perioral and lingual musculature equilibrium.

Most crucially, the restoration of normal muscle activity may be due to improvements in both the skeletal and dentoalveolar components of the malocclusion. [11]

Furthermore, because elastomeric equipment functions as a shield, isolating the dentoalveolar structures from the perioral muscles, prior data suggests that the perioral musculature can be rebalanced in the same way as rigid functional equipment, such as the Fränkel appliance, can, but the results are better and faster to achieve. [12]

CONCLUSIONS

The most crucial aspect of Myobrace appliance therapy is selecting the correct clinical scenario. From a clinical point of view the appliance has improved the major physiologic functions such as: nasal breathing, tongue position, lip seal, normal swallowing and phonation. Another important role of these appliances are the skeletal growing patterns and improving the overall aspect of the profile.

Mandibular retrognathism can be successfully treated by myofunctional appliances during growth spurt. Patient cooperation and repeated motivation is a critical factor during the treatment with elastodontic appliances.

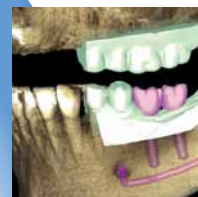
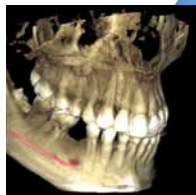
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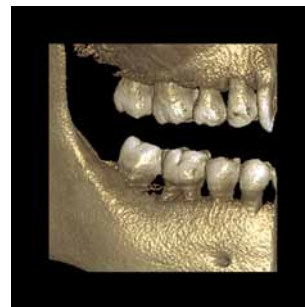
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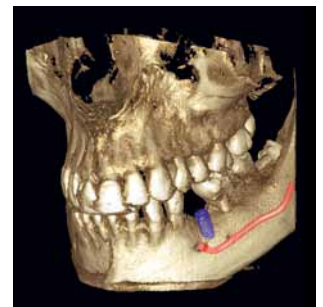
The Planmeca ProMax concept offers a full range of imaging volumes providing detailed information on patient anatomy. The comprehensive Planmeca ProMax platform complies with every need in dental radiology, offering digital panoramic, cephalometric, and 3D imaging as well as 3D face photo together with advanced imaging software.

At the heart of the concept is the robotic SCARA technology: the unique robotic arm enables any movement pattern required by existing or future program, eliminating all imaging restrictions. With the Planmeca ProMax concept superior maxillofacial radiography can be performed with a single platform, today and in the decades to come.

All volume sizes



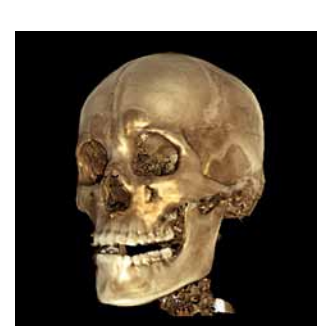
Planmeca ProMax 3D s
Ø42 x 42 mm–90 x 60 x 130 mm



Ø34 x 42 mm–140 x 105 x 130 mm



Planmeca ProMax 3D Mid
Ø34 x 42 mm–Ø160 x 160 mm



Planmeca ProMax 3D Max
Ø42 x 50 mm–Ø230 x 260 mm

Planmeca Romexis

Software refined



Planmeca Romexis is the software of choice for all dental imaging purposes. All patient's digital images – intraoral and extraoral X-ray images, 3D volumes, and photographs – are processed and stored in one easy-to-use system. Planmeca Romexis offers a complete set of tools for image viewing, enhancement, measurement, and implant planning, and fully integrates digital imaging with the patient's other clinical data.

Thanks to its powerful printing features, stunning printouts can be produced. Planmeca Romexis provides direct image capture from Planmeca X-ray units, interfaces with 3rd party devices via TWAIN, and is fully DICOM-compatible. Planmeca Romexis is a JAVA software that runs on Windows, Mac OS, and Linux operating systems, and embraces modern IT standards.



INSTRUCTIONS FOR AUTHORS

The journal publishes general reviews, studies and clinical, epidemiological, experimental and laboratory research, clinical case presentation, papers from the history of medicine, reviews, scientific and technical state-of-the-art articles, medical informations and opinions. Only papers which have not been published or sent for publishing in other journals are accepted. The authors are responsible for the opinions expressed in the papers. *The paper must be edited both in Romanian and in English; the English version will be supervised by our collaborator Dana Brehar-Cioflec, MD, PhD; typed on white A₄ paper and on CD, DVD or Memory Stick.*

Manuscripts will not exceed:

- general reviews: 6-8 pages
- studies and researches: 5-7 pages
- case presentations: 2-4 pages
- reviews, scientific and technical state-of-the-art articles, medical informations and opinions: 1-2 pages.

The paper will be edited according to international editing rules for manuscripts. The title will be written in capital characters and it will be followed by the name and surname of the author (authors), followed by their place of work (place where the paper has been elaborated). Studies and researches will be followed by a brief abstract, followed by 3-4 key-words.

The body of the paper will be structured on the following chapters: introduction, aim, objectives, material and method, results and discussions, conclusions. The references will be presented alphabetically and in conformity to the Vancouver Convention, including:

- for articles: name of the authors and surname initials, title of the article in the original language, title of the journal according to the international abbreviation system, year of issue, volume, number, pages;
- for books: name of the authors and surname initials, volume, publisher (editors), city of publishing, year of issue.

Citation of references inside the body of the paper will be put between brackets, Harvard style (author, year) or Vancouver style (number in square brackets or superscript). Cited reference titles will be selected, maximum 6 for studies and case presentations and 12 for general reviews. Acceptance, rejection or the need of alterations in sent materials, or in inconography, will be communicated to the authors in due time. For this, the authors will indicate the person and address for correspondence (phone number, e-mail address). Given the less pleasant experience of the editorial board with some articles being rejected because they did not meet publishing criteria, we decided to support those who intend to publish in this journal by detailing the way such a paper should be elaborated, as well as our requirements.

Except some particular aspects concerning this journal, the following details are general requirements asked or imposed by other journals as well. Conditions to be met in order to propose a paper for publishing. The main author has the responsibility to make sure the article has been approved by all the other authors. The journal will have copyright

for papers accepted for publishing. The editorial board reserves the right to change the style and dimensions of an article (major changes will be discussed with the main author) and to decide the date of issue.

2. FIRST PUBLICATION

The editorial board will not consider a paper already reported in a published general review or described in a paper proposed to or accepted by another journal. This does not exclude papers which have been rejected by other journals. Also, papers which have been presented at a scientific meeting will be accepted for discussion if they have not been entirely or partially published in a similar publication. „Multiple“ publishing of the same study is seldom justified. One of the possible justifications is publishing in a second language but only if the following conditions are met:

- Editors of both journals involved are fully informed;
- Priority of the initial publication will be respected by a minimum publishing interval of two weeks;
- For the second publication, a shortened version will suffice;
- The second version strictly reflects data and interpretations in the first;
- A footnote may state: „This article is based upon a study initially published in [title of the journal]“.

3. PATERNITY

Paternity must reflect the common decision of the coauthors. Each author must have participated enough to take public responsibility for the content. A paper with collective paternity must have a key person responsible for the article.

4. COPYRIGHT

In order to reproduce materials from other sources, written agreement from the copyright owner must be obtained:

- photographer – for unpublished photographs;
- hospital where the photographer (physician) is employed – for unpublished photographs performed during the employment period;
- initial publisher – for a table, picture or text which have previously been published elsewhere.

5. ETHICAL ASPECTS

Do not use name of patients, initials or hospital observation charts numbers. If a photograph of a body part which could allow direct or deductive recognition of the patient needs publishing, then the paper must be accompanied by the written consent of the patient and clinician, as well.

6. PRESENTING THE MANUSCRIPT

6.1. CONTENT OF THE PAPER - INDICATIONS FOR ORIGINAL ARTICLES

Paper title [Book Antiqua 20, bold, left alignment]



Surname N.¹, Surname N.² [Book Antiqua, 14, bold]

¹ *Author Affiliation (DEPARTMENT, FACULTY, UNIVERSITY, CITY/COMPANY) [10, italic]*

² *Author Affiliation (DEPARTMENT, FACULTY, UNIVERSITY, CITY/COMPANY) [10, italic]*

Correspondence to:

Surname Name: [10, italic]

Address: [10, italic]

Phone: +40 [10, italic]

E-mail address: [10, italic]

Abstract [Book Antiqua, 12, bold, justify alignment]

Recommendations for original studies

Original studies must include a structured abstract 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; The abstract will be translated into an international circulation language.

Keywords: Innovation, technology, research projects, etc. [Book Antiqua 9].

INTRODUCTION [Book Antiqua, 11, bold, left alignment]

Introduction presentation of general aspects, in the context of the approached theme.

Introduction include **Aim and objectives** – Define the aim of the article. Briefly expose the rationale of the presented study or observation. Make strictly pertinent referrals and do not exhaustively review the subject. Do not include data or conclusions from the paper.

There is a limitation of 4/6 pages. All pages size should be A4 (21 x 29,7cm). The top margins should be 2 cm, the bottom, right, margins should be 2cm and left margins should be 2,85 cm. All the text must be in one column and Book Antiqua font, including figures and tables, with single-spaced 10-point interline spacing.

***Aim and objectives* [Book Antiqua 11, bold italic, left alignment]**

The text included in the sections or subsections must begin one line after the section or subsection title. Do not use hard tabs and limit the use of hard returns to one return at the end of a paragraph. Please, do not number manually the sections and subsections; the template will do it automatically.

[Book Antiqua, 11 point, normal, justified alignment].

MATERIAL AND METHODS [Book Antiqua, 11, bold, left alignment]

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). [Book Antiqua, 11 point, normal, justified alignment].

RESULTS [Book Antiqua, 11, bold, left alignment]

Present results in a logical succession as text, tables and illustrations. Emphasize or briefly describe only important observations. [Book Antiqua, 11 point, normal, justified alignment].

DISCUSSIONS [Book Antiqua, 11, bold, left alignment]

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. [Book Antiqua, 11 point, normal, justified alignment].

CONCLUSIONS [Book Antiqua, 11, bold, left alignment]

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. [Book Antiqua, 11 point, normal, justified alignment].

REFERENCES [Book Antiqua, 11, bold, left alignment]

A numbered list of references must be provided at the end of the paper. The list should be arranged in the order of citation in the text of the publication, assignment or essay, not in alphabetical order (according to the Vancouver rules). List only one reference per reference number. It is very important that you use the correct punctuation and that the order of details in the references is also correct.

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Internet Documents - Standard format - #. Author A, Author B. Document title. Webpage name [format]. Source/production information; Date of internet publication [cited year month day]. Available from: URL. [Book Antiqua, 10 point, normal, justified alignment].

[1] _____
[2] _____
[3] _____

6.2. CONTENT OF THE PAPER - INDICATIONS FOR CASE REPORTS

Content of the paper for case report will respect indications for original articles.

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 possible. The case report must not appear as an appendix of a general review. Dimensions of a case report: maximum 6-8 typed pages, 30 rows of 60 characters/page.

6.3. MEASUREMENT UNITS, SYMBOLS, ABBREVIATIONS

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

6.4. TABLES

Tables are noted with Roman figures and they will have a brief and concise title, concordant with their content.

6.5. ILLUSTRATIONS

Number all illustrations in Arabic figures in a single succession. Apply a label on the back side of every illustration, containing its number and an arrow indicating the upper side. Coloured illustrations may be accepted but it is the choice of the editors, according to particular technical abilities of each journal issue, or it may involve a fee in special cases.

6.6. EXPLANATIONS FOR DRAWINGS AND GRAPHS

Explanation for drawings and graphs must be clear and in readable dimensions, considering the necessary publishing shrinkage.

6.7. PHOTOGRAPHS

Offer glossy, good quality photographs. Any annotation, inscription, etc. must contrast with the ground. Microphotographs must include a scale marker.

6.8. ILLUSTRATION LEGENDS

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

7. COPIES FOR PUBLISHING

In order to accelerate publishing, the main author will send a set of printed sheets presenting the final version of the paper, as it will appear in the journal. It is really helpful that texts to be also sent on electronic support, diacritic characters mandatory.

8. REJECTION OF PAPERS

If a paper does not meet publishing conditions, whatever these may be, the editors will notify the first author on this fact, without the obligation of returning the material. Original photographs or the whole material will be returned only if the author comes to the editor and takes them.

Papers submitted for publishing will be addressed to:

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The image shows a variety of elmex dental care products. At the top, a white lab coat with a blue tie is visible, with a dental mirror and a toothbrush tucked into the pocket. Below this, several elmex products are displayed: a tube of elmex PROFESSIONAL toothpaste, a box of elmex ANTI-CARIES PROFESSIONAL toothpaste, a box of elmex KARIESSCHUTZ PROFESSIONAL toothpaste, a box of elmex SENSITIVE PROFESSIONAL toothpaste, and a box of elmex JUNIOR toothpaste. A circular seal on the right side of the products reads "MARCA RECOMANDATĂ Numărul 1* în Germania DE MEDICII STOMATOLOGI".

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