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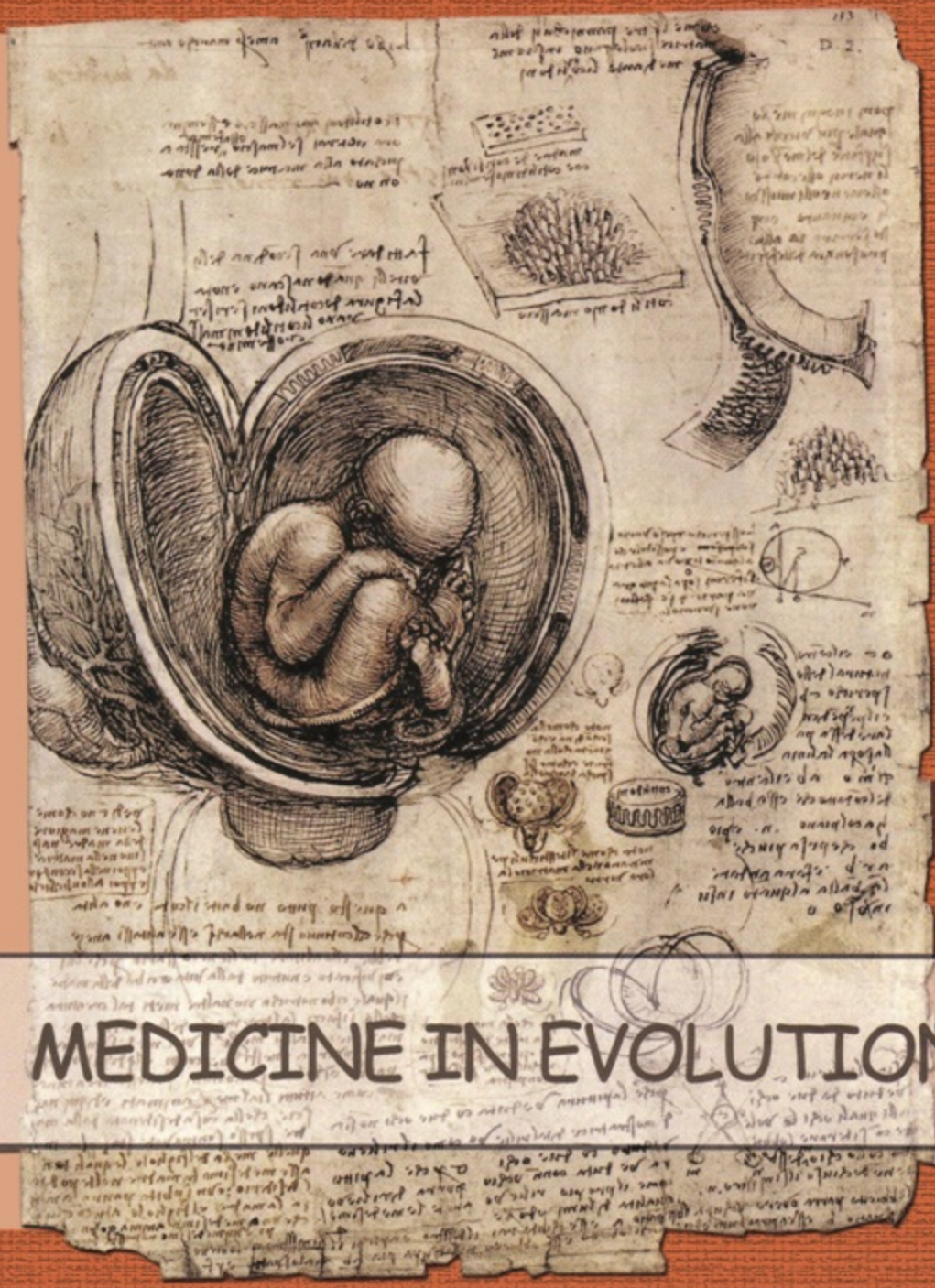

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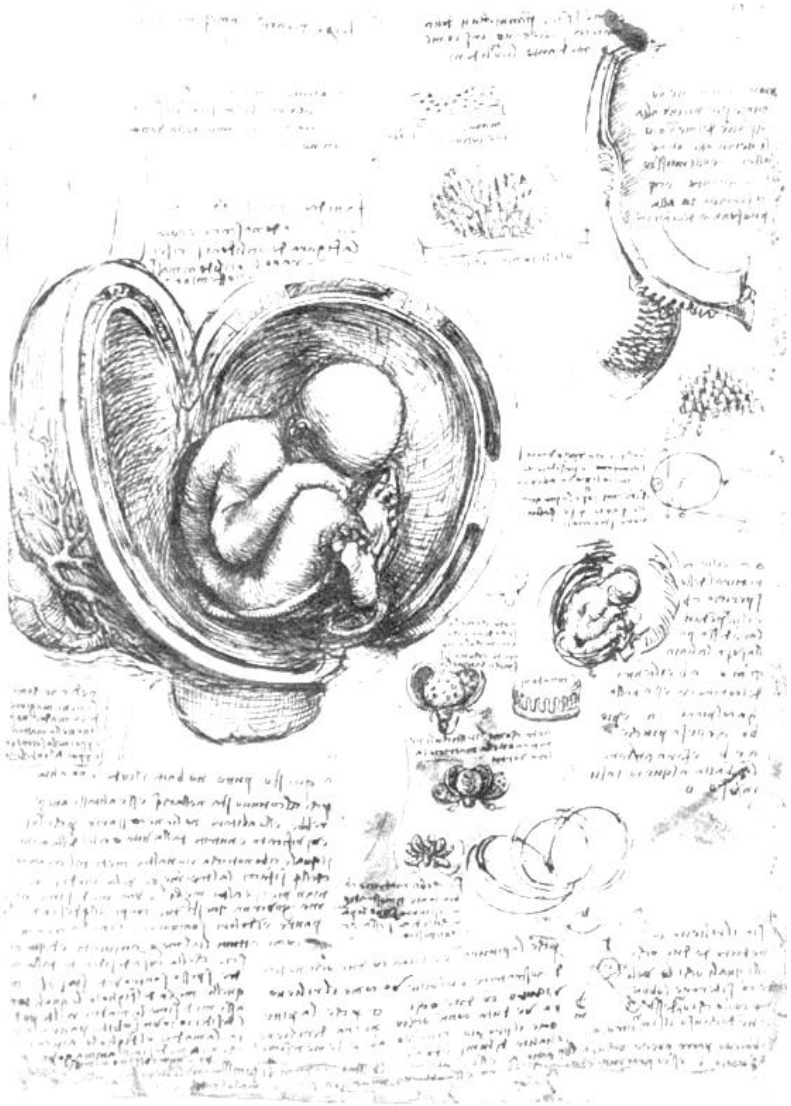

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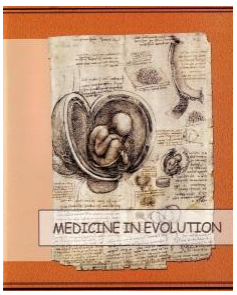

ARTICLES

Dental Hygienist

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

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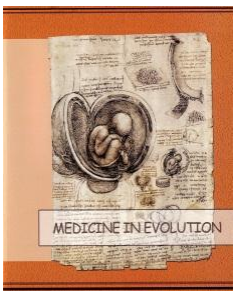
Interference between antihypertensive therapies and zinc bioavailability in geriatric patients



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Abstract

Aim and objectives: To investigate the effect of chronic triple antihypertensive therapy with amlodipine, valsartan and hydrochlorothiazide *versus* captopril treatment on zinc bioavailibility in geriatric hypertensive patients by assessing zinc levels in serum and urine.

Material and methods: In a 8 month open-labeled, experimental, observational and retrospective survey, unfolded at the Timis County Center of the Ministry of the Internal Affairs, were enrolled 90 geriatric patients, classified according to the administered antihypertensive treatment in two homogenous study groups: Group I, with patients treated only with Captopril, and Group II, treated with a fixed-dose combination of Aml + Val + HCTZ 10/320/25 mg. All patients received a daily zinc supplement.

Results: Significant increase in urinary zinc excretion after 8 months of treatment was observed only in the captopril-treated group ($p < 0.005$).

Conclusions: Triple antihypertensive combination therapy with fixed dose is safer and does not interfere with zinc bioavailability.

Key words: geriatric hypertensive patients, captopril, triple antihypertensive therapy with amlodipine, valsartan and hydrochlorothiazide, zinc bioavailability.

INTRODUCTION

High blood pressure (HBP) is an important public health problem that currently affects more than 1 billion adults worldwide, and the incidence of this chronic disease is progressively increasing, estimated to reach 1.5 billion patients in 2025 (1).

From a pharmacological and clinical point of view, many studies have highlighted the fact that in the geriatric patient, long-term maintenance of blood pressure (BP) values below 140/90 mmHg and respectively below 130/80 mmHg (in the diabetic patient or in renal insufficiency) is achieved by monotherapy only in one third of cases, most patients requiring combination of 2, 3 or even 5 drugs from different antihypertensive therapeutic classes (2), (3).

Captopril, commonly administered as monotherapy for three decades, is a specific angiotensin-converting enzyme (ACE) inhibitor, with beneficial effects in geriatric patients with HBP, left ventricular dysfunction post acute myocardial infarction and diabetic nephropathy (4).

Currently, according to therapeutic guidelines, fixed-dose antihypertensive combinations are recommended because they improve the compliance and the tolerability, especially in geriatric patients with polypragmasia. Studies over the last decade have approached *the combined therapy of three agents,* namely amlodipine (a calcium channel blocker), valsartan (an angiotensin receptor blocker) and hydrochlorothiazide (a thiazide diuretic) in the form of a single-tablet (Aml + Val + HCTZ), offers increased safety (5).

Zinc has proven its effectiveness in geriatric patients with elevated blood pressure because it is a trace mineral that acts as an important antioxidant and anti-inflammatory agent, protecting also against atherosclerosis and improving the quality of their life (6). Many studies performed on this category of patients have analyzed the implications of different antihypertensive drugs on zinc status but data are still controversial (7), (8).

Aim and objectives

To investigate comparatively the effect of chronic triple antihypertensive therapy with amlodipine, valsartan and hydrochlorothiazide *versus* captopril treatment on zinc bioavailibility in geriatric hypertensive patients by assessing zinc levels in serum and urine.

MATERIAL AND METHODS

Clinical, experimental study design and treatment protocol

In an 8 month open-labeled, experimental, comparative observational and retrospective survey, unfolded during the period 01.01.2014-30.09.2014, at the Timis County Center of the Ministry of the Internal Affairs, Timisoara, Romania were enrolled 90 geriatric patients, 42 females and 48 males. The mean age was 74.2 ± 3.4 years (range, 65–80 years). The subjects were assigned in two study groups, according to their antihypertensive therapy:

- Group I – 45 subjects treated only with captopril, given as 50 mg twice-daily.
- Group II – 45 subjects treated with a fixed-dose combination of Aml + Val + HCTZ 10/320/25 mg, as a single-tablet once-daily.

All patients were given a twice-daily supplement of 44 mg zinc sulfate for 8 months.

Zinc was assessed in the serum prior to the start of treatment and again 4 months later, as well as at the end of the study. Urine zinc samples were analyzed comparatively prior to the start of treatment and 8 months later.

All patients in the study groups expressed written consent to participate in this survey, according to the criteria set out in the Helsinki Declaration (9).

The patients were given instructions to avoid foods with high calcium, fiber and phytic acid, dietary constituents that have a negative impact on zinc absorption.

Inclusion criteria:

- Geriatric patients with moderate or severe HBP diagnosis according to current European guidelines;
- Stopping any other pre-existing medication for HTA treatment 1 month before enrollment;
- Cessation of other OTC drugs, nutritional supplements or vitamins 1 month before inclusion in the study;
- The use of aspirin for cardioprotection purposes was allowed.

Exclusion criteria:

- Geriatric patients with blood pressure values exceeding 180-110 mmHg;
- Severe diseases - angina pectoris, myocardial infarction, arrhythmias, valvular diseases, orthostatic hypotension, atrioventricular blocks, electrocardiographic changes;
- Serious pancreatic, hepatic or renal co-morbidities, diabetes mellitus;
- Patients with allergic/atopic diathesis or hypersensitivity to captopril, amlodipine, valsartan or hydrochlorotiazide;
- Medical or surgical conditions that may affect the absorption, distribution, metabolism or excretion of drugs.

Methods of assessment of plasma and urinary zinc bioavailability

Serum zinc levels were evaluated by atomic absorption spectrophotometry, using an AAS_1 – Shimadzu 2001 spectrophotometer, equipped with graphite furnace, with control and computed processed data. The standardized zinc curve had a coefficient r = 0.9939. Blood samples were previously mineralized with nitrogenous acid at a temperature of 160^0C, for 15 minutes, on a microwave mineralizer MARS – 5, CEM 2001.

24-hour urinary zinc excretion was performed from samples of 10 mL (minimum: 0.4 mL) urine from a well mixed 24 hour urine collection using a Dynamic Reaction Cell-Inductively Coupled Plasma-Mass Spectrometry (DRC-ICP-MS).

Zinc determinations were performed at the Toxicology Laboratory belonging to the Timisoara County Emergency Clinical Hospital.

Interpreting of the results and statistical analysis

Results were expressed as mean and standard deviation and statistical significance was established at $p<0.005$. One-way ANOVA statistic analysis was used when serum zinc concentrations were compared. All statistical analyses were performed using the SPSS software package (version 21.0 for Windows, SPSS Inc, Chicago, IL.).

RESULTS

Initial concentrations of serum zinc indicated that all elderly patients enrolled in the study, with HBP, were below the normal range of serum zinc standard (<70 µg/dL), respectively 59 ± 10 µg/dL in Study Group I and 62 ± 4 µg/dL in Study Group II. So, according to the data from literature, our research reveals that zinc insufficiency is a characteristic of elderly patients (10).

During the 8 month zinc supplementation, a progressive increase in serum zinc concentrations were observed until the end of the study. This aspect is represented in figure no.1.

One-way ANOVA: Serum Zinc mo 0; Serum Zinc mo 4; Seric Zinc mo 8

Analysis of Variance

Source DF SS MS F P

Factor 2 3162,7 1581,3 28,58 0,000

Error 96 5311,3 55,3

Total 98 8474,0

Individual 95% CIs For Mean

Based on Pooled StDev

Level N Mean StDev -------+---------+---------+---------

Zinc mo. 0 90 58,710 7,169 **(---*---)**

Zinc mo. 4 90 64,509 7,213 **(----*---)**

Zinc mo. 8 90 72,497 7,909 **(---*---)**

-------+---------+---------+---------

Pooled StDev = 7,438 60,0 66,0 72,0

Figure 1. The results of One-way ANOVA Analysis of Variance applied for the determination of serum zinc concentrations at 0, 4 and 8 month, applied in each of the main stages of the study; there have been revealed significant statistic differences ($p<0.005$).

When considering the urinary zinc excretion in 24-h urine collection, normal daily excretion of zinc in the urine is found in the range of 20 to 967 mcg/24 h (11). At baseline, were revealed normal values in both study groups, namely 320 ± 12 mcg/24 h in Study Group I and respectively 280 ± 8 mcg/24 h in Study Group II.

Significant enhancement of 24-hour urinary zinc excretion after 8 months of treatment was observed only in the captopril-treated group ($p < 0.005$) (table I).

Table I. Significant enhancement of 24-hour urinary zinc excretion in the Captopril Study Group

Study Group I (Captopril)	No. Subjects	Urinary zinc excretion in 24-h urine collection (mcg/24 hour)	Statistical significance
Baseline	45	320 ± 12	
After 8 month	45	650± 4	$p < 0.005$

In the Study Group II, receiving triple fixed-dose combination antihypertensive therapy, no significant statistical evidence was pointed out ($p >0.005$) (table II).

Table II. Enhancement of 24-hour urinary zinc excretion in the Aml + Val + HCTZ 10/320/25 mg Study Group

Study Group II (Aml + Val + HCTZ)	No. Subjects	Urinary zinc excretion in 24-h urine collection (mcg/24 hour)	Statistical significance
Baseline	45	280 ± 8	$p > 0.005$
After 8 month	45	285 ± 10	

It is the merit of the several teams of researchers coordinated by Leary et al. (1992), Fernandes et al. (1996) and Golik et al. (1998) - who discovered the fact that ACE inhibitors, namely the drugs captopril and enalapril have functional groups such as sulphydryl or carboxyl, whose capacity for binding zinc determines the mineral status of the organism (12).

Our results support these researches, and explain the significant enhancement of 24-hour urinary zinc excretion due to captopril therapy by the interference of zinc bioavailability with metal-catalyzed reactions.

Further research which we wish to do, as a continuation of the present study, will be focused on the effects of oral zinc supplementation upon serum copper, total cholesterol, HDL-cholesterol, LDL-cholesterol and serum triglycerides in patients with increased risk of coronary artery disease.

CONCLUSIONS

1. Experimental results show that selective antihypertensive drugs can affect the mineral status in geriatric patients, and influence especially the bioavailability of zinc.
2. Long-time therapy with ACE inhibitors (Captopril) cause excessive zinc deficiency in the elderly hypertensive patient in comparison with the triple fixed-dose combination antihypertensive therapy which is safer and with fewer side effects.
3. The knowledge of these aspects is important for health care providers who follow-up geriatric hypertensive patients.

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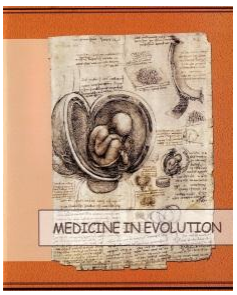
Challenges of adrenal incidentaloma management detected after unilateral kidney removal



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Abstract

A non-secretor adrenal tumour needs to be removed due a large diameter, increasing dimensions or changing features over the time. Sometime the decision is to follow-up the patient if the mass is regarded as incidentaloma and this requires a differential diagnosis to an adrenal metastasis, especially in patients with a prior malignancy as kidney cancer. Sometimes, detailed imagery scan after a kidney removal accidently detects an otherwise asymptomatic adrenal incidentaloma. We introduce two female cases report: a 61-year subject with a right adrenal mass detected after left nephrectomy for renal cancer, respective a 56-year patient followed for more than a decade for a right incidentaloma after left kidney removal and later on a contra-later adrenal incidentaloma was also added. A multi-disciplinary team is the key of providing adequate management in patients with adrenal masses and unilateral nephrectomy.

Keywords: nephrectomy, adrenal incidentaloma, renal cáncer

List of abbreviations:

CT = Computer Tomography

PET- CT = Positron Emission Tomography - Computer Tomography

cm = centimeter

NSE = neuron specific enolase

UN = unilateral nephrectomy

INTRODUCTION

Unilateral nephrectomy (UN) performed for malignant or benign conditions (such as severe forms of kidney stones, large renal cysts, etc) may require a series of investigations for complete assessment at initial diagnosis or during follow-up, thus the detection of an endocrine incidentaloma as adrenal incidentaloma or thyroid nodules is highly possible. **(1,2)**These newly discovered masses may remain otherwise completely asymptomatic for a long period of time. **(1,2)**If a renal cancer is confirmed, spreading of the disease to adrenals is possible, an endocrine check-up being necessary for differential diagnosis with a non-secretor accidental benign finding**. (3)**

CASE PRESENTATIONS

We aim to introduce a series of two cases involving menopausal women who were referred for specific endocrine assaysafter they had a UN.

The evaluation of endocrine profile for adrenal and thyroid glands was done. The subjects agreed to present their medical history by signing the informed consent. They were followed at different endocrine and non-endocrine Romanian Departments. The consent was signed between October 2015 and October 2016 at the moment they had the most recent evaluation during admission at an Endocrinology Department.

Case 1

This is a 61-year old non-smoking womanwho was admitted for endocrine check-up of two masses that seem incidentaloma: the discovery of a thyroid nodule and a right adrenal solid lesion. The family medical history includes father with colonic cancer and lung metastases. Personal medical records are related to menopausal osteopenia diagnosed three years ago; type 2 diabetes mellitus under Metformin in the last two years, arterial hypertension since last decade, controlled under specific drugs. She had a left nephrectomy for a renal tumor two years prior to current admission. Histopathological examination confirmed a renal carcinoma with clear cells, Fuhrman Nuclear Grade of 2 (pT3N0Mx). No further therapy was considered from a urologic and oncologic point of view. As management, the patient was referred to have periodic CT (Computer Tomography) scans.

First post-operatory CT evaluation identified a right adrenal tumor of 1.2/1.6 cm. Thus, endocrine exam was needed. At that moment, the patient was seen as an outpatient and no specific endocrine anomaly was recorded. A whole body bone scintigram was also done and excluded bone metastases. **(Figure 1)** She continued to do periodic imaging assays. Two years later, on current admission, adrenal profile showed a circulating chromogranin A of 84ng/mL(normal between 20 and 125ng/mL), neuron specific enolase (NSE) of 5.25ng/mL (normal between 0 and 12 ng/mL), normal 24-urinary metanephrines and normetanephrines as well as 1mg overnight dexametasone (DXM) test. These confirmed the non-secretor pattern of right adrenal tumor that remained stationary as dimensions at CT. For the moment the adrenal mass was considered an adrenal incidentaloma thus serial imaging scans were advised. Moreover, thyroid was also assessed since cervical and thoracic CT scan pointed two thyroid nodules. Thyroid function was normal, negative thyroid antibodies were found (as thyreoperoxidase antibodies of 10UI/mL, normal <35 UI/mL), in association with normal circulating calcitonin of 0.5 pg/mL (normal between 5.17 and 9.82 pg/mL). Thyroid ultrasound confirmed the CT findings: a left thyroid nodule of 2.3/ 2.1 cmand a right thyroid lobe with a nodular conglomerate of 3.8/2.4 cm. Fine needle aspiration showed well differentiated follicular pattern. Clinically, no breathing or eating difficulties, neither speech anomalies were found. Close follow-up was recommended. Anyway, the patient's preference was to postpone the thyroidectomy. Due to non-specific bone and joint pain, bone profile was

evaluated and hypovitaminosis D was confirmed (25-hydroxyvitamin D of 24.9ng/mL, withnormal levels between 30 and 100ng/mL) without any other anomaly. Therapy with vitamin D supplements was offered to the patient.

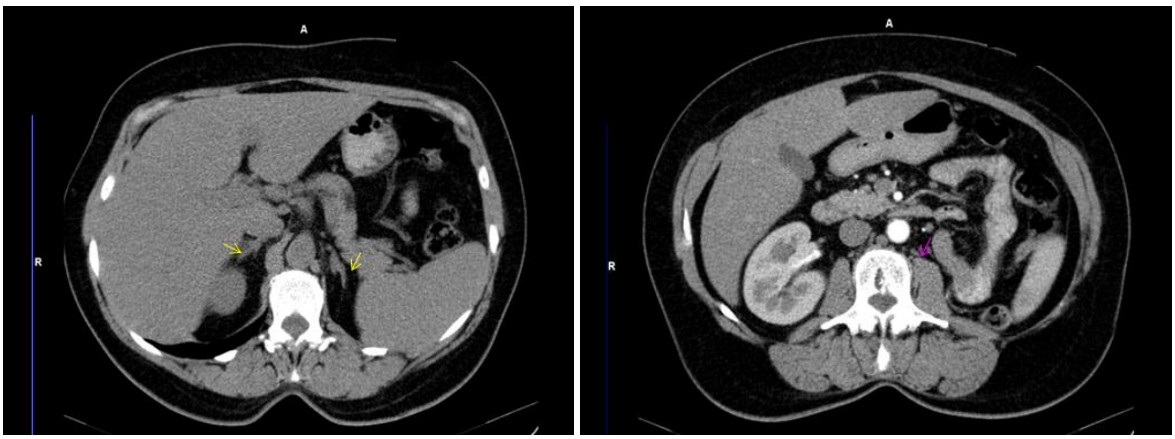

Figure 1. Negative whole body bone scintigrame on a 61-year old patient with left nephrectomy for renal carcinoma and right adrenal incidentaloma

Case 2

This is a 56-year old former smoker female who had the left kidney remove in 2002 because of a benign condition (large renal cysts with local severe infection). One year after surgery was done a right adrenal tumor of 1.2 cm maximum diameter was discovered at CT scan. Yearly radiological assays (abdominal computed tomography or ultrasound) were performed and showed stationary results. After 13 years since UN, the subject became hypertensive so an endocrine evaluation was considered. Mild doses of calcium blockers were used to control the blood pressure. Clinical exam showed a body mass index of 28 kg/sqm without any particular phenotype. She associated gastritis and hyperlipemia. The endocrine testes pointed a NSE of 13 ng/mL (Normal between 0 and 12ng/mL), chromogranin A of 72 ng/mL (Normal between 20 and 125ng/mL), and intact adrenal function. **(Table 1)**The re-evaluation based on CT scan showed stationary aspects for right adrenal tumor but also a left adrenal tumor of 1.3 cm was identified. **(Figure 2)** Adrenal surgery was not recommended despite small increase of NSE, considering that the adrenal tumors are most probably incidentalomas. Nevertheless, abdominal CT scan performed one year later showed similar aspects. **(Figure 3)** Blood tests pointed normal NSE. Further serial imagery was recommended.

Table 1. This is a 56-year old female with bilateral adrenal masses (probably incidentalomas) and unilateral nephrectomy. The panel of endocrine assays is displayed at age of 55 years (13 years since kidney removal was performed)

Parameter	Patient's value	Normal limits	Units
ACTH (Adrenocorticotropic Hormone)	7	3-66	pg/mL
Plasma morning cortisol (baseline)	16	4.8-19.5	µg/dL
Plasma morning cortisol (inhibition test)	0.88	<1.8	µg/dL
Plasma metanepfrines	17	10-90	pg/mL
Plasma normetanephrines	43	20-200	pg/mL

*after 2 days * 2 mg Dexamethasone test

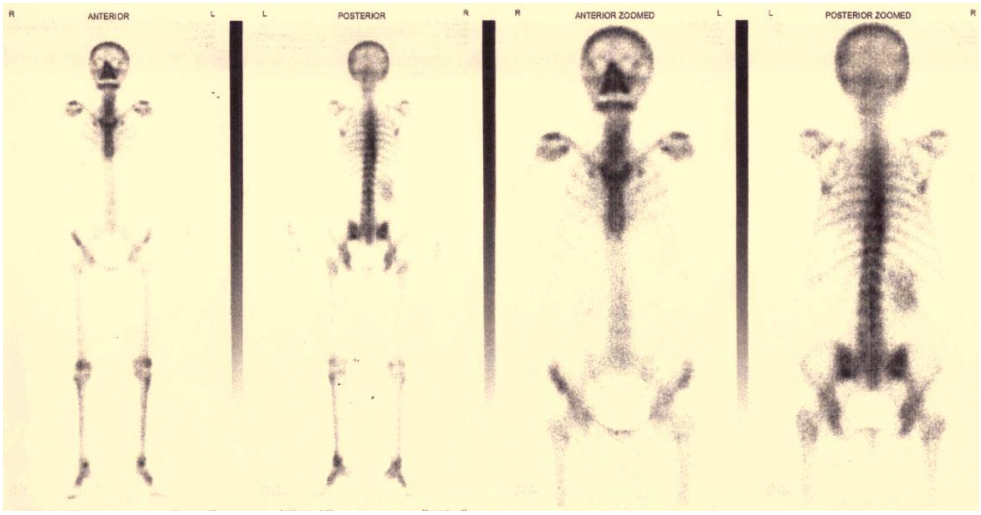

Figure 2. The time-dependent pattern of bilateral adrenal masses on an adult female with unilateral nephrectomy. The values represent the diameters of tumours as provided by computer tomography scan during 14 years of follow-up since initial renal surgery

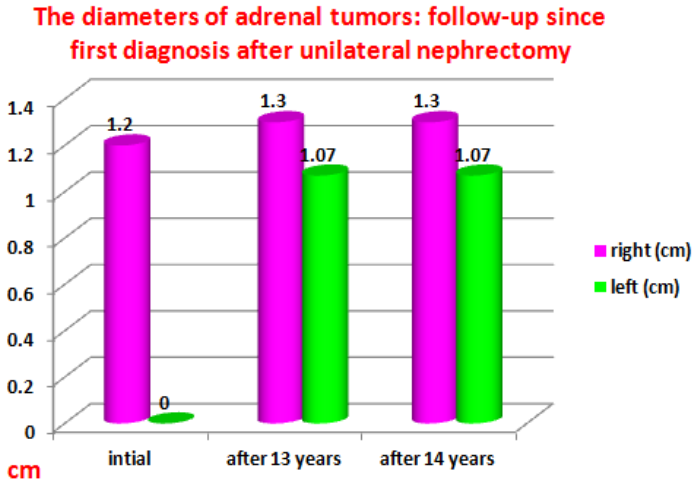

Figure 3. Abdominal CT scan with intravenous contrast: bilateral adrenal incidentalomas (yellow arrows) on a 56-year old female with left nephrectomy (pink arrow)

DISCUSSION

Surgery for renal cancer (RC) do not necessarily involves adrenals remove so, if an endocrine tumor at this level is found during follow-up, it has to be differentiated from metastases of prior kidney condition. **(4,5)**On the other hand, the nephrectomy for different non-malignant conditions also requires imagery assessment of the renal and adrenal area and this might detect completely asymptomatic solid masses (incidentaloma). **(6,7)** The second patient developed during follow-up synchronous bilateral adrenal tumors. Until the latest evaluation, the diagnosis remained of bilateral adrenal incidentalomas. These are rare radiological findings which may be associated with a mild persistent cortisol secretion but this was not confirmed in our case. **(8,9,10,11,12,13,14)**If the diameters of tumors are significantly changed during follow-up, first step of therapy is unilateral adrenalectomy of the largest mass.**(8,9,10,11,12,13,14)**This particular interventional aspect is not required for the moment in mentioned patient's case. A thyroid incidentaloma was identified in first case. The term is less used as for adrenals or hypophysis and the accidental detection of thyroid nodules is expected in patients with a previous malignancy who need multiple radiological assays due to high frequency in general population. **(15,16,17,18,19,20,21)** However, thyroid is rarely involved in metastases from cancers of different origins (especially for gastro-intestinal

cancers and neuroendocrine tumors). **(15,16,17,18,19,20,21)** The discovery of a thyroid lump at ultrasound, CT, PET-CT (Positron Emission Tomography) requires function and autoimmunity evaluation and, in selected cases, a fine needle aspiration to provide the cytological exam.**(15,16,17,18,19,20)**

CONCLUSIONS

Adrenal incidentaloma in patients with unilateral nephrectomy needs to be differentiated from metastases from kidney cancer. Also, serial imagery assessments after kidney removal may lead to the discovery of different solid masses as thyroid incidentaloma or nodules.

Conflict of interest

The authors have nothing to declare.

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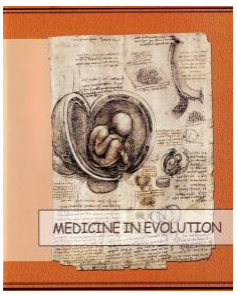
Insight into the histopathological and immunohistochemical heterogeneity of multiple breast carcinomas



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Abstract

Background: The pathological characteristics of multiple synchronous breast carcinomas are not well established. The definitions of multifocal and multicentric breast carcinomas are still debated and it is difficult to estimate the prognostic significance of multiple invasive carcinomas and their response to available treatments.

Patients and Methods: A retrospective analysis of 36 consecutive cases of invasive multiple breast carcinomas, diagnosed from January 2015 to December 2016 was performed. All 36 invasive carcinoma specimens, were evaluated histologically and immunohistochemically, including the assessment of tumor diameter and distribution, grading, lymphovascular invasion as well as expression of ER, PR, HER2, Ki-67, E-chaderin and p53.

Results: Out of the 36 invasive breast carcinomas assessed, 4 of them had a multicentric distribution. All multicentric tumors were of Luminal A phenotype, were not associated with grade 3 disease ($p>0.05$) but they were associated with lymph node invasion ($p<0.05$).

Conclusion: Multicentric invasive carcinomas had a greater proportion of lymph node invasion compared to multifocal or unifocal disease but no other statistically significant differences could be found.

Keywords: brest carcinoma, invasive, tumor, immunohistochemical marker

INTRODUCTION

Invasive breast carcinomasare the most frequent carcinomas in women, comprisinga large group of heterogeneous subtypes, presenting with different clinical and biologic characteristics that have implications in the choice of therapy as well as overall survival. Ductal invasive carcinoma and lobular invasive carcinoma are the most commonly diagnosed types, accounting for40%-75%, respectively 5%-15% of all cases [1].

Studies performed on large-format histologic sections revealed that breast carcinomas feature a complex morphology with variable tumor distribution, ranging from unifocal to multifocal/multicentric and diffuse [2]. The American Joint Committee on Cancer (AJCC) uses the term "multiple carcinoma" andrequiresa minimal distance of 0.5 cm between two distinct foci in order to define them as such [3,4].Another definition of multifocal and multicentric ductal carcinoma was established on the presence of two or more foci within a single quadrant of the same breast or within two or more quadrants of the same breast, respectively.Often, multicentricity implies more than one primary tumor, while multifocality indicates multiple foci of the same tumor [5-8].

Some studies show an increased lymph node involvement in multiple tumors compared to unifocal tumors, and available data suggests that multifocal/multicentric breast cancer is actually more aggressive and carries worse overalloutcome than unifocal disease [9]. In other studies, multiplicity itself does not appear to be a contributing factor to a worse outcome [10, 11]. It has been suggested that multifocal/multicentric tumors do not share the same tumor biology as unifocal tumors and other factors than tumor volume, surface area, histology, tumor grade and vascular invasion have been shown to affect behavior. In fact, the prognostic impact of multiple breast cancer has been poorly studied and the need for specific adjuvant treatment to counteract potentially unfavorable effects of multiplicity has not been established [12].Therefore, the distinction between unifocal, multifocal and multicentric ductal carcinomas could be prognostically important [13] as well as their histopathological and immunohistological heterogeneity.

The mRNA expression profiling of invasive ductal carcinomas has provided a molecular classification of the tumors, identifying five major patterns of gene expression: luminal A, luminal B, HER2 positive, basal-like, and normal breast like tumors. There are significant differences in survival regardingpatients from different groups [1]. During routine clinical practice, these subtypes can be diagnosed with improved accuracy using immunohistochemical markers as surrogates. The standard immunohistochemical panel recommended for all invasive carcinomas of the breast, regardless of their histologic type orgrade, includes antibodies tracing estrogen receptors (ER), progesterone receptors (PR), c-erbB-2 oncoprotein overexpression (HER2),epithelial markers (E-cadherin), myoepithelial markers (cytokeratin (CK)5/6, CK14, CK17, and epidermal growth factor receptor (EGFR))as well asoutcome predictive markers such as Ki-67 proliferation index and p53 status [2-14].As a result, immunohistochemical phenotype serves both as prognostic and predictive factor of the disease [2].

Despite the relatively high incidence of multiple tumors (ranging from 6% to 60% in the literature), there is little data to establish a clear relationship between the gross morphology (unifocal, multifocalor multicentric) of the lesions and the phenotype of invasive ductal carcinoma (presence of ER, PR, overexpression of HER2) [15, 16]

In this study, we aim to identify a relationship between tumor morphology and phenotypic features of invasive ductal carcinomas. We randomly selected and analyzed36 cases of mutiple breast carcinoma,in order to determine theirhistologicalgrade, presence of lymph node metastases, immunoexpression of estrogen and progesterone receptors,as well as HER2 oncoprotein for each group,while evaluating the possibility for histopathological and

immunohistochemical mismatches between different tumoral foci or between tumoral foci and lymph node metastases.

MATERIALS AND METHODS

2.1. Study population

We performed a retrospective analysis of 36 consecutive cases of multiple invasive breast carcinomas, diagnosed between January 2015andDecember 2016in the Department of Pathology of the Emergency University Hospital in Bucharest, Romania. Purely in-situ carcinomas, as well as carcinomas not routinely stained with immunohistochemical markers were excluded from the study. For the assessment of multifocality, we used the AJCC criteria. Clusters with less than 200 cells were not considered separate foci. For each case we analyzedgross morphology, histological grade, lymph node status (pN) and immunohistochemical markers like ER, PR, HER2 and Ki67 within multiple tumoral foci and lymph node metastases.

2.2. Specimen collection and processing

Specimens were obtained either by excisional biopsy, total mastectomy or lumpectomy, with or withoutaxillary lymph node dissection, after an initial radiological (mammography or ultrasound) and clinical assessment. Following macroscopic examination, the tissue samples were fixed in 10% buffered formalin for 24 hours, then processed and embedded in paraffin. Afterwards, three-micron thick sections were stained with hematoxylin and eosin.

2.3. Histopathology assessment

Single tumors were defined as either unifocal tumors occurring in any part of the breast or as severallesions occurring at a distance of <0.5cm from each other.Synchronous tumors of the ipsilateral breast occurring at a distance of >0.5cm from each other were defined as multiple tumors – either multifocal (multiple foci in the same quadrant) or multicentric (multiple foci in different quadrants).

The sizes of all tumor foci were measured (largest diameter of the largest tumor focus). The type of tumor according to WHO classification, the status of the margins, the Nottingham Histologic Score (the Elston-Ellis modification of Scarff-Bloom-Richardson grading system) as well as the presence LCIS and/or DCIS were all included in the pathology report.

Lymph node invasion (LNI) was defined as the presence of metastatic cells in at least one lymph node examined; both sentinel and non-sentinel lymph nodes were examined. Perineural invasion (PNI) was defined as the presence of metastatic tumor cells around and through nerves or the finding of tumor cells within any of the the layers (epineurium, perineurium, endoneurium) of the nerve sheath.

Subtype definitions were as follows: Luminal A type (ER positive, HER2 negative, Ki-67 low), Luminal B or B-like (ER and PR positive/negative, HER2 negative, and either Ki-67 high or PR low or any Ki-67 and PR levels respectively), HER2 positive and Triple negative or basal-like (ER negative, PR negative, HER2 negative).

2.4. Immunohistochemistry

Immunohistochemical study was performed on unstained paraffin sections using an indirect tristadial Avidin-Biotin complex method. The sections were deparaffinated in toluene, dehydrated in alcohol series, rehydrated and washed in phosphate buffered saline. Then they were incubated with primary antibody overnight, washed with carbonate buffer and developed in 3,3'-diaminobenzidine hydrochloride/hydrogen peroxide nuclear

counterstaining with Mayer's Hematoxylin. The following markers were used: ER (estrogen receptor mouse monoclonal antibody produced by Biocare, dilution 1:100, clone 1D5 (catalog number ACA 054 A), PR (progesterone receptor mouse monoclonal antibody produced by Biocare, dilution 1:100, clone SP2, catalog number ACA 302 A), c-erbB-2/HER2 (mouse monoclonal antibody produced by Biocare, dilution 1:50, clone EP3 previously known as EP1045Y, catalog number ACA 342 A), Ki67 (mouse monoclonal antibody produced by Biocare, dilution 1:100, clone SP6, catalog number CRM 325 A), E-Cadherin (mouse monoclonal antibody produced by Biocare, dilution 1:100, clone HECD-1, catalog number CM 170 A) and c-erb2/Her2 (rabbit monoclonal antibody produced by Biocare, dilution 1:50, clone EP3, catalog number ACA 342 A, B).

ER and PR were considered positive when >10% tumor cells featured nuclear staining. HER2 positivity was assessed according to the kit package insert. The cut-off level for Ki-67 positivity to be accepted in the luminal A category was considered 15%. Tumors with ≥50% p53-positive cells were classified as tumors withp53 overexpression.Human epidermal growth factor receptor 2 IHC tests were all interpreted as positive (3+), negative (0–1+), equivocal (2+), or inadequate for accurate interpretation according tothe American Society of Clinical Oncologists (ASCO) and College of American Pathologists (CAP)recommendations for HER2 IHC testing.

2.5. Statistical analysis

Only multiple breast tumors were included in this study. Tumor phenotype, along with invasive tumor distribution were recorded in a database. We performed a statistical analysis using MedCalc software. A comparison of proportions of multifocal versus multicentric tumorsfor each tumor phenotype feature was performed using chi-square test. A p-value of 0.05 was considered the cut-off for significance and any correlation with a p value<0.05 was consideredsignificant. The results were recorded in Table. 2.

RESULTS

A total of 36 cases of invasive breast carcinomas were included in the study, according to the inclusion and exclusion criteria.The mean age at presentation was 62.3 (range 36–87 years). 82% of patients had a palpable mass in their breast and the remaining patients were diagnosed after mammographic examination. The laterality of the lesions was as follows: left-sided in 64%of thepatients and right-sided in 36% There were 4/36 (11%) multicentric invasive tumors; all the other 32/36 (89%) cases were multifocal tumors. The 32 multifocal invasive carcinomas were of the following histological type: 27 were breast carcinoma of no special type (ductal), 3 were invasive lobular carcinoma, 1 was papillary carcinoma and 1 was a mixed type. Out of the 4 multicentric invasive carcinomas, 2 were lobular invasive carcinoma, 1 was ductal and 1 was a combined type of ductal and lobular invasive carcinoma.

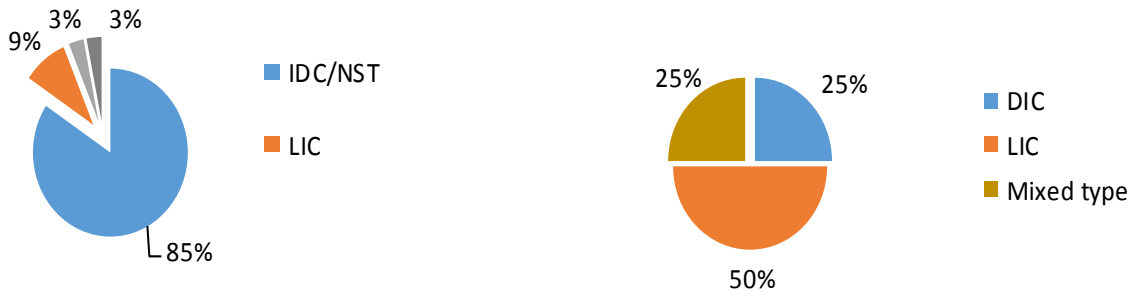


Figure 1. Multifocal breast carcinomas (left) and multicentric breast carcinomas (right) by distribution and histology type

Lymph node invasion was present in 18/36 cases (50%). 4 of the lymph node positive tumors were multicentric while the other 14 were from multifocal cases. The difference is statistically significant (p=0.037).

Histological grade, assessed in all 36 invasive carcinomas, was in 3/36 (8%) cases G_1, 29/36 (81%) cases G_2 and 4/36 (11%) G_3. Out of the 4 invasive carcinomas of G_3 grade, 3 were of multifocal distribution and 1 of multicentric distribution. The difference is not statistically significant.

Molecular phenotypes of the invasive tumors were as follows: 67% of all invasive tumors were of Luminal A type (ER positive, HER2 negative, Ki-67 low), 19% Luminal B of B-like (ER positive, HER2 negative/overexpressed, and either Ki-67 high or PR low or any Ki-67 and PR levels respectively) and 14% were Triple negative (ER negative, PR negative, HER2 negative). All 5 triple negative invasive carcinomas were of multifocal distribution. All 4 multicentric invasive tumors were of Luminal A type. There were no cases of HER2 positive multiple breast carcinomas (*Table 1).*

Out of the 36 specimens stained for ER/PR/HER2, 24 were ER positive and 12 were ER negative. There were 20 multifocal and 4 multicentric, ER positive invasive carcinomas. The difference was statistically not important.

PR positive tumors added up to a total of 29; 25 of them were multifocal while the other 4 were multicentric invasive carcinomas. No statistically significant differences were noted.

Table 1. Molecular phenotypes by invasive tumor distribution in 36 cases of Multiple Invasive Breast Carcinoma

Molecular phenotype	Multifocal	Multicentric	Total%	
Luminal A	20	4	24/36	(67%)
Luminal B	7	0	7/36	(19%)
Triple negative	5	0	5/36	(14%)
Her2 +	0	0	0/0	(0%)

HER2 was assessed in all 36 invasive carcinomas. Only in 4 cases the tumors were expressing HER2, and all of them were of multifocal distribution. No multicentric tumor expressed HER2. However, all 4 cases scored 2+ according to the ASCO-CAP guidelines and were interpreted as negative. Their negative status was confirmed using additional test such as SISH.The differences in immunoexpresion of HER2 between multifocal and multicentric tumors were statistically not significant. *(Table 2).*

Table 2. Tumor features by invasive tumor distribution in 36 cases of Invasive Breast Carcinoma

Tumorfeatures	Multifocal	Multicentric	Total	SignificanceValue
ER +	20/32	4/4	24/36	*p = 0.139*
PR +	25/32	4/4	29/36	*p = 0.304*
HER2 +	4/32	0/4	4/36	*p = 0.470*
Triple negative	5/32	0/4	5/36	*p = 0.401*
G_3	3/32	1/4	4/36	*p = 0.516*
LNI	14/32	4/4	18/36	***p = 0.037***

3.1. Heterogenic histopathological and immunohistochemical features

From the histopathological point of view, among the 36 evaluated cases, 4 had mismatches concerning the histhopathological subtype and in 9 cases we observed mismatches between the tumoral grade of the index tumor and different concomitant foci (in 3 cases the index tumor had lower grade (G1) whereas at least one foci had greater tumoral grade (G3); interestingly all 3 cases had G3 tumoral lymph node invasion. From all 4 cases in which the histopathological appearance mismatched, the most frequently encountered association was invasive carcinoma of NST (ductal) with invasive lobular carcinoma.

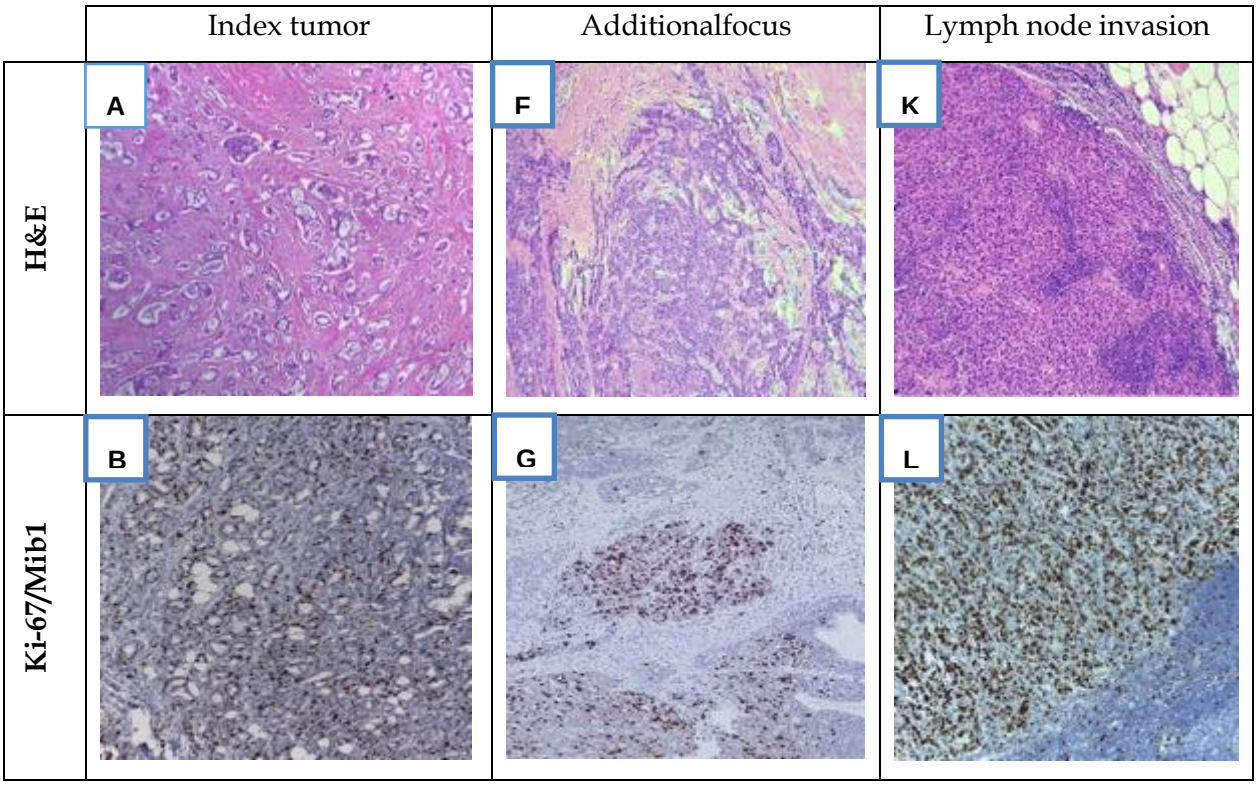
Ancillary tests revealed mismatches in 11 cases in at least one immunohistochemical parameter.

Estrogen receptor (ER) was mismatched in 4 cases (the index tumor was negative and at least one foci was positive or displayed some degree of ER positivity). All 4 cases had lymph node invasion (LNI) but only one had ER mismatched immunoexpression, the LNI being ER positive). We noted 5 multiple breast cancer (all multifocal) with ER positive index tumor with at least one foci negative or with lower ER. LNI was not mismatched in those cases.

Progesteron receptor (PR) showed greater heterogenic immunoexpresion between the index tumor and different concomitant foci and/or LNI. 21 cases displayed mismatches: the index tumor was PR positive whereas at least one foci was negative for PR. LNI was noted in 18 cases with index tumor positive for PR, but only 5 had lymph node tumoral invasion negative for PR. On the other hand, 6 PR negative index tumors had at least one foci with low or positive PR immunoexpresion. All 6 cases had lymph node invasion, but only 2 displayed mismatches.

Although we did not find any HER 2 positive multiple (multifocal or multicentric) invasive breast carcinoma, assessing HER2 positivity revealed 4 cases which displayed some positivity, scoring 2+, being considered negative (results later confirmed by SISH) in a heterogeneous manner (some foci were completely negative, whereas some areas showed some positivity, but not enough to be considered for 3+ score)

Ki-67/Mib1 proliferative index was mismatched in 25 cases. 8 of those cases had an index tumor with low Ki-67 immunoexpresion whereas at least one foci had high expression. We also noted intratumoral hot-spots in 28 cases.



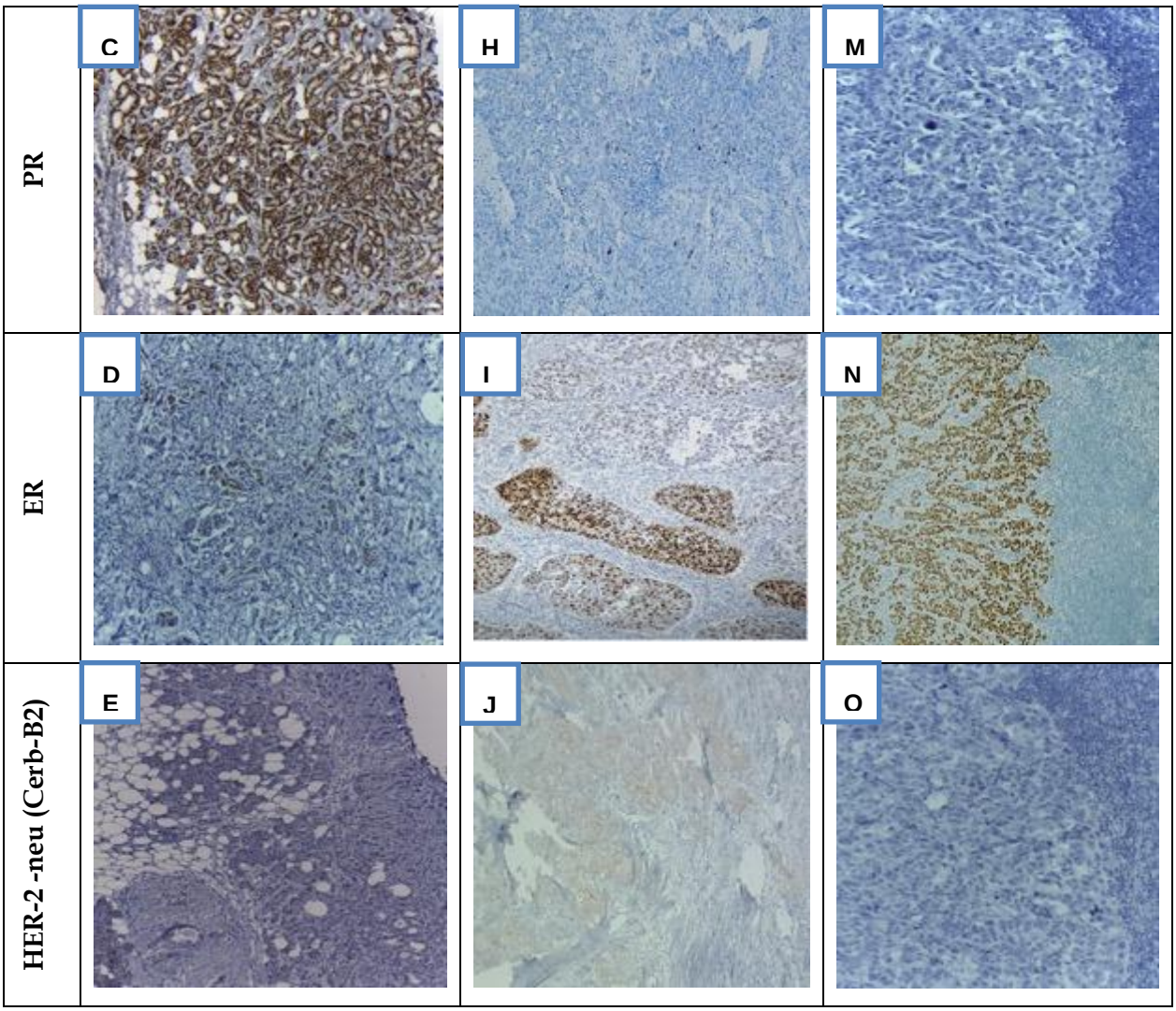


Figure 2. *(previous page)*A suitable example of a case of multiple breast carcinoma NST (multifocal) displaying both morphologic (ingrading) and molecular mismatches between the index tumor, additional tumoral focus and LNI. **A-E- Index tumor**: grade 1 NST invasive carcinoma (hematoxylin and eosin; A), with the following immunohistochemical profile:low Ki-67 immunoexpresion in approx. 20% of tumor cells (B); PR positive 95% (C), low ER immunoexpression in approx. 20% tumor cells (D), and HER2 negative/score 0 (E) confirmed by SISH.**F-J Smaller additionalfocus**:grade 3 invasive breast carcinoma NST (F) with a differentmolecularprofile: high Ki-67 index (approx. 60%) with hot-spots (G), PR positive immunoexpresion in approx., 3% tumor cells (H), ER focally lost, but still positive in a significant amount of tumor cell - 50% (I); and HER2 negative score 1 (confirmed by SISH). **K-O Lymph node invasion**: G3 invasive brest carcinoma NST in a axillary lymph node (K) with very high Ki-67 imunoexpresion (90%-L), PR negative (M), ER positive in approx. 95% of tumor cells (N) and HER2 negative/score 0, confirmed by SISH (O).

DISCUSSIONS

The lack of a standard definition of unifocality, multifocality and multicentricity imposes a challenging problem in interpreting the current literature. In some series, focality and centricity is determined by histologic parameters, while other authors use only clinical and radiographic variables. Results in the literature regarding the significance of multiple breast cancer foci are still conflicting, and the impact of multifocality/multicentricity on overall survival rate is still controversial, mainly due to the use of various definitions lacking a wide international consensus [10].

The incidence of reported cases of multifocal/multicentric invasive carcinomas is less than the incidence of unifocal disease, [2, 13, 18] however, it is high enough to require a more extensive research regarding their features for an optimization of the treatment options.

Previous studies whichevaluated histologic and immunohistochemical features found that most multifocal/multicentric breast cancers had similar histologic and immunohistochemical characteristics [19, 20] while others described different histologic and immunohistochemical features among multifocal/multicentric tumors [21]. Data in the literature suggests that invasive lobular carcinoma (ILC) is more frequently associated with multifocal/multicentric disease [1, 14, 22]. Despite the favorable prognostic features of ILC (low grade, ER positive, HER2 negative, low Ki-67), there remains controversy regarding the outcome of patients with LIC versus invasive ductal carcinoma NST. Several studies have reported a more favorable outcome for ILC than invasive carcinoma NST, [19, 23-26] while others found no significant difference [1, 27-29] or a worse prognosis [30, 31]. In other studies, ILCs had a higher rate of lymph node metastasis than invasive carcinoma NST and in the long-term follow-up, ILCs are more likely to have distant metastases, recurrences and mortality [27, 32]. In our study, half of the multicentric carcinomas (n=2) were of ILCtype. Similar to previous studies, we found a weak association (p=0.037) between multicentric tumors and axillary lymph node involvement.Hormone receptor and HER-2 status of individual tumor foci in multifocal/multicentric breast cancers may have clinical implications in the choice of treatment with hormonal therapy, chemotherapy, target therapy, or associated treatments. All multicentric invasive carcinomas included in our study were hormone receptor positive, and HER2 negative (luminal A subtype) but no statistically significant results were recorded. We did not, however, analyze the response to the treatment and long-term survival of the patients.

Tot et al. investigated the immunophenotype of multifocal and unifocal breast cancer (estrogen and progesterone receptor expression, HER2 overexpression and expression of basal-like markers, CK5/6, CK14, and epidermal growth factor receptor) and found higher rates of LNI in the multifocal group, and no differences with respect to molecular phenotype [2]. These findings were underlined by Pekar et al. who also demonstrated that diffuse or multifocal distribution of the invasive component is associated with cancer-related death independent of the molecular phenotype [18].According to our results, there were no significant differences between multifocal and multicentric invasive carcinomas regarding histological grade, ER, PR, and HER2 status.In our study, we identified a statistically significant association with lymph node invasion.Moreover, we have identified multiplecases with great heterogeneity in regards tohistological grade, subtypeand molecular immunoexpresion between the index tumor, associated additional tumoral foci and/or lymph node invasion. In those particular cases, a change inthe chemotherapy or oncologic treatment might have therapeutical value, especially if the lymph node invasion shows major mismatches of ER, PR and HER2 immunoexpresion with the index tumor.

CONCLUSIONS

This study points out the importance of evaluating heterogeneity of multiple tumoral foci and/or lymph node invasionin cases of multiple breast cancer because immunohistochemical mismatchesmay occur between the index tumor, additional foci and lymph node invasion. Thus, the oncologic treatment should be properly adapted in these particular cases and even more, considering that the current guidelines do not take into account the morphologic and molecular heterogeneity of multiple breast cancer.

Acknowledgement

We, the undersigned, certificate that the procedures and the experiments have been done respecting the ethical standards of the Helsinki Declaration of 1975, as revised in 200017, as well as the national law.

Conflict of interests

None to declare.

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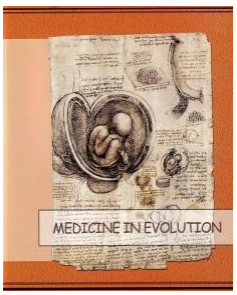
Two dimensional (2D) and three dimensional (3D) strain analyses of the left ventricle in a team of athletes using speckle tracking method



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Abstract

The study **objective** was to compare the two-dimensional and three-dimensional global longitudinal strain (2D GLS and 3D GLS) of the LV in a lot of athletes to find a parameter that connects LV contractile function and exercise capacity of athletes. We analyzed 26 male athletes (regional rugby players team) and we split the group into two equal groups, every 13 athletes performing predominantly anaerobic exercise and aerobic respectively. **Results.** Athletes who had greater LV hypertrophy and LV mass indexed higher had a better response in tests of anaerobic exercise capacity. There was a statistically significant association between the 3D ejection fraction (EF) and anaerobic and aerobic exercise capacity ($p = 0.016$ $p = 0.044$). There were no statistically significant differences of the average 2D and 3D GLS between two categories of athletes ($p = 0.59$, $p = 0.27$). **Conclusions:** Our study demonstrated the interdependence of LV hypertrophy in athletes and response to tests of exercise capacity. Regarding myocardial deformation parameters, showed no statistically significant differences between 2D vs 3D GLS of the LV analyzed in this category of athletes.

Keywords: athletes, speckle tracking, 3D echocardiography

INTRODUCTION

Three-dimensional (3D) echocardiography had a continuous development, reaching from a method reserved for research in specialized laboratories, to a relatively affordable method with multiple implications in clinical practice. This happened due to a continuous evolution in the development of techniques and the related software equipment (mainly transducers) that enable identified acquisition and analysis of 3D images from any angle and orientation, both in real time and post processing-acquisition (off-line) of these 3D images.

3D echocardiography proved its usefulness in evaluating the cardiac volumes (left ventricle LV, right ventricle RV, left atrium LA) as well as systolic and diastolic function of LV-defects analysis of myocardial contraction and intracardiac dissincronism, accurate evaluation of the morphology of valves (mitral, aortic, tricuspid valve and less pulmonic), intracardiac shunts (1).

In this paper we analyze the LV systolic function (ejection fraction EF, myocardial deformation-strain) using the standard 2D echocardiography and speckle tracking method with 2D and 3D echocardiography respectively. 2D speckle tracking technique (called 2D strain echocardiography) is based on tracking the dynamics of multiple myocardial dots (basically a fingerprint of the myocardial wall) throughout the cardiac cycle and post processing the data with the help of a special program. These dedicated softs allow the calculation of deformation and rotation of LV myocardium.

The parameters that can be calculated are: displacement, velocity, strain, strain rate (SR), rotation, twist and untwist. All of this applies to the segments or the entire LV (2). The most widely used parameter, which we have used in our study, an important component of ventricular systolic function, is longitudinal deformation (global longitudinal strain GLS).This parameter defines the total deformation during the cardiac cycle length, being expressed in percentage (3). The value of GLS is calculated using the arithmetic average of all segments analyzed of the LV (4).

Three-dimensional speckle tracking echocardiography has as major advantage the fact that manages tracing the movement of all myocardial dots, and of those who are lost in the assessment of complex 2D motion, so long as these remain dots inside 3D volume purchased. Another advantage over 2D method is that time for images acquisition shall be reduced by two thirds (5). It can be analyzed the same parameters we have remembered at speckle tracking 2D technique.

These techniques have been already described in athlete's heart evaluation; echocardiography already demonstrated a special importance in evaluating the LV systolic and diastolic function in athletes. Most studies have shown an increase of global longitudinal strain (2D GLS) after high-intensity physical training, assessed using speckle tracking method (6). Three-dimensional echocardiography also showed the best physiological adaptation changes of heart in different types of sports exercise (7).

LV physiologic hypertrophy appears as change of heart morphology at complex exercise intensive training. Thus, it is well known that dynamic endurance efforts, in which predominantly is aerobic effort, produce alterations of LV morphology by increasing diameters and volumes (eccentric hypertrophy), while static efforts, endurance, anaerobic produce especially thickening of the LV walls (concentric hypertrophy). In practice, there is not accurate a type of physical workout or a model of sport in that effort to be solely aerobic or anaerobic type (dynamic or static) and for this reason, changes at the level of the heart are both "load" and "pressure" combining concentric hypertrophy with increased LV diameters (8).

The **aim** of our study is the comparison of 2D and 3D GLS of LV in a team of athletes, in order to find a parameter to evaluate the LV function and estimate the effort capacity of the athletes.

MATERIAL AND METHOD

Twenty six male athletes from the regional rugby players' team were evaluated in the Institute of Cardiovascular Diseases Timisoara, Romania. The team consists in two groups of athletes based on predominance of dynamic aerobic or anaerobic performed effort. First thirteen of them (group 1) are in defense line and are engaged mostly in anaerobe effort (strength players). Next thirteen (group 2) are in attack line and perform predominantly dynamic aerobic effort (runners).

All athletes underwent a complete physical exam, complete 2D and 3D transthoracic echocardiographic exam at rest. Their physical performance was evaluated with specific protocols of exercise testing.

Within the clinical examination were measured: weight (W), height (H), body surface area (BSA) (after diagram Du Bois), and body mass index (BMI). Using the indirect method for measuring those 5 envelops of adipose tissue: 1/3 of the brachial triceps, subscapular, flank, abdominal and upper 1/3 of the thigh were previously calculated (9):

Adipose tissue (AT)% = the sum of the five envelopes (mm) x 0.15 + 5.8 + BSA (m2)

Adipose tissue (AT) (kg) = W x AT%

Active (lean) mass (AM) = W (kg) – AT

Optimal AM = G x 89%

Optimal adipose tissue (optimal AT) = AM x 11%

Optimal body weight (optimal W) = optimal AM + optimal AT

Standard transthoracic bidimensional (2D) echocardiographic study was performed by an experienced echocardiographer using a Vivid E9 ultrasound machine (GE Healthcare) with an M5S probe. All athletes were examined in the left lateral position, before the exercise tests.

Standard 2D measurements - LV diastolic diameter (LVDD) and LV systolic diameter (LVSD), interventricular septum (IVS) and posterior wall (PW) thickness - were obtained in the parasternal long axis view. LV mass was automated calculated according to the ASE recommendations. LV end diastolic and end systolic volumes (LVEDV, LVESV) were obtained in the apical four chamber view. LV ejection fraction (EF) was calculated using the Simpson biplane method. Resting LV diastolic function was assessed by E and A wave velocities, E/A ratio from the mitral inflow, according to the EAE recommendation (10). Left atrium (LA) volume was assessed in ventricular end-systole by the modified Simpson's monoplane method in the apical four-chamber view according to the guidelines.

Pulsed tissue Doppler imaging data were obtained from a 2 mm sample volume placed at the lateral mitral annulus, medial mitral annulus and lateral tricuspid annulus in the apical 4 chamber view recorded during an end-expiratory apnea period.

Mitral respective tricuspid annular plane systolic excursion (MAPSE respective TAPSE) was calculated by the difference between end-diastolic and end-systolic measurements (mm).

For 2D Speckle tracking evaluation, global longitudinal strain (2D GLS) was computed from high frame rate (>50 frame/sec) apical views (four chambers, two chambers and three chambers) using speckle tracking analysis (Echo Pac, Version 12BT, GE Healthcare). 2D GLS was obtained by averaging the segmental strain curves of all 17 segments of LV and was represented in a color coded bull's eye plot (11).

Real time three dimensional (3D) echocardiography data set acquisitions were acquired by the same examiner using a 3V matrix array transducer (GE Healthcare). A full volume data set of the LV was acquired from apical view, consisted in four consecutive beats ECG-gated sub volumes at the end of expiration and breathe holding. Two or three datasets for patient were obtained, stored and exported to an off-line workstation for further analysis (Echo Pac, Version 12BT, GE Healthcare). With a specific software algorithm (4D AutoLVQ™ – GE Healthcare), LV volumes, LV EF, LV Mass and 3D global longitudinal strain (3D GLS)

were calculated according to actual recommendations (12). All steps were followed as described in the previous studies:

- Automatic slicing of the entire full LV volume dataset
- Automatic alignment of all the three planes from apical view
- Identification of LV endocardial border both in diastole and systole (automatic with manual correction if necessary) with calculation of LVEDV and LVESV
- Analysis and data display (EF % = LVEDV-LVESV/LVEDV x100)
- Further evaluation of LV mass and strain were calculated using automatic border detection of pericardium (with optional manual correction).

LV Mass = (LV pericardial volume –LV endocardial volume) x1.05. 3D

LV mass was indexed for height powered to 2.7.

3D GLS was automated generated and presented in regional and average strain curves and also in color-coded 17 segments bull's eye plot (13).

Physical performance evaluation

Following clinical examination, 12-lead electrocardiogram and resting echocardiography, patients underwent an exercise test with cycle ergometer (Astrand treadmill test for maximal oxygen consumption (VO2 max) evaluation) (14). The aerobe endurance capacity was measured in a 6 minute cycle ergometer test with a constant workload (2,5W x Body weight (kg) and cadence (60 r.p.m.). The heart rate in the last 10 seconds was measured; the specific values obtained were indexed on body weight (kg) and then compared with ideal values (%). The values above 75% indicate a good athlete's aerobe endurance capacity.

Although the physical functional status was analyzed by measuring the HR in minute 5 of intense effort (P1) and in minute 1, 2 respective 4 of relaxation period (P2, P3 and P4). The lowest values of the sum of P1, P2, P3 and P4 show good effort tolerability. Aerobe effort was also evaluated with systolic tension time test (STT test). HR and systolic blood pressure (SBP) were measured in minute 6 of maximal effort and STT value was calculated with formula:

STT/watt/body weight = HR min6 x SBP min6/W/kg

Athletes were also tested for anaerobe effort evaluation. A new test (Szoghy-Cherebetiu test) at cycle ergometer was used (Workload of 7,5%/body weight with 90 r.p.m) (15)

Total mechanical work (TTR %) was calculated at 10 seconds of effort, 20 seconds and 45 seconds of effort. Grades of Excellent (E), Very good (FB), good (B) and medium (M) were allocated depending on obtained values.

Statistical analysis of the data was performed with SPSS 17 software.

Clinical and echocardiographic characteristics as well as physical performance measurements were expressed using mean and standard deviation for continuous variable and proportions for non-continuous variable.

Bivariate analysis was conducted with all continuous variables with independent samples t- test and with non-continuous variables with a Chi-square test. Regression analysis with Pearson's correlation coefficient was used to evaluate the relation between 3D echocardiographic parameters and other variables.

RESULTS

Clinical, physical and echocardiographic characteristics of entire group of athletes were illustrated in Table I.

Table I. Clinical, physical and echocardiographic characteristics of entire group of athletes

Characteristics	Media±SD	Characteristics	Media±SD
Age (years)	25.77±3.32	E' lat (m/s)	0.1742±0.04053
Height (H) (cm)	182.88±7.02	A' lat (m/s)	0.0754±0.02570
Weight (W) (kg)	101.77±15.15	S' med (m/s)	0.1485±0.20728
BMI (kg/m²)	30.37±3.75	E' med (m/s)	0.1215±0.02257
BSA (m²)	2.23±0.18	A' med (m/s)	0.0777±0.01751
W optim (kg)	82.96±9	MAPSE (mm)	20.04±1.90
AT (kg)	24.25±6.59	TAPSE (mm)	29.88±4.81
Exces AT (kg)	10.65±7.92	2D GLS (%)	-18.01±2.12
AM (kg)	77.08±10.31	3D GLS (%)	-15.99±2.70
AM deficit (kg)	-6.49±6.72	3DLVEDV (ml)	166.12±25.37
LVEDD (cm)	5.28±0.43	3DLVESV (ml)	71.27±13,95
LVESD (cm)	3.47±0.36	3D EF(%)	0.56±0.03
IVS (cm)	1.19±0,11	3D LVMass(mg)	139.92±12.81
PW (cm)	1.17±0,12	Mmod LVMass(mg)	303.13±50.02
LVEDV (ml)	145.38±37.86	iMmod LVMass (mg)	136.89±16,73
LVESV (ml)	59.34±15.75	P1 (b/min)	143.75±9.44
iLVEDV (ml)	67.11±9.16	P2 (b/min)	101.75±11.66
iLVESV (ml)	27.63±3,88	P3 (b/min)	90.75±9.24
4C EF(%)	.5838±0.0444	P4 (b/min)	81.75±15.40
LAD (cm)	4.05±0.50	POWER	2.34±0.22
LAA (cm²)	22.17±3.55	VO2max (%)	83.99±10.51
LAV (ml)	69.12±17.73	DIST6	2.30±0.20
E (m/s)	0.8527±0.15280	TTR10 (%)	79.30±9.06
A (m/s)	0.4200±0.09042	TTR20 (%)	75.32±7.98
S' lat (m/s)	0.1063±0,01974	TTR45 (%)	67.54±9.08

Bivariate data analysis showed statistically significant differences between the two groups of athletes that are discussed below (Table II).

Table I. Statistically significant differences between the studied variables (comparison between the two groups of athletes)

Group 1 > Group 2
Height (p-value=0.007, Independent-samples t test, 95% CI)
Weight (p-value<0.001, Independent-samples t test, 95% CI)
BMI (p-value=0.002, Independent-samples t test, 95% CI)
BSA (p-value<0.001, Independent-samples t test, 95% CI)
Woptim (p-value=0.004, Independent-samples t test, 95% CI)
AT (p-value=0.001, Independent-samples t test, 95% CI)
AM (p-value=0.001, Independent-samples t test, 95% CI)
LAA (p-value=0.006, Independent-samples t test, 95% CI)
A'lat (p-value=0.004, Independent-samples t test, 95% CI)
3D LVEDV (p-value=0.006, Independent-samples t test, 95% CI)
3D LVESV (p-value=0.011, Independent-samples t test, 95% CI)
3D LVMass (p-value=0.002, Independent-samples t test, 95% CI)
LAD (p-value=0.001, Mann-Whitney test, 95% CI)
S'med (p-value=0.01, Mann-Whitney test, 95% CI)
MAPSE (p-value=0.033, Mann-Whitney test, 95% CI)
Group 1 < Group 2
E'lat (p-value=0.047, Independent-samples t test, 95% CI)
E'med (p-value=0.021, Independent-samples t test, 95% CI)
AM Deficit (p-value=0.001, Mann-Whitney test, 95% CI)

Those in group 1 had higher BMI, BSA, optimal W, AT, AM. Considering echocardiographic parameters there were also differences between the two groups. Group 1 had higher LA area (LAA), 3D LVEDV, 3D LVESV, 3D LVMass, LA diameter (LAD), A'lat, S'med, MAPSE. Group 2 had higher E'lat, E'med.

There were no statistically significant differences of the average 2D 3D GLS and GLS between those two categories of athletes, defense and attack (p-value = 0.59, Independent-samples t test, 95% CI, i.e. p-value = 0.27, Independent-samples t test, 95% CI).

Analyzing categorial variables (those of physical performance) we have determined that there are differences between the categories of TTR10calif: CIS (p-value = 0.026, One Way ANOVA test, 95% CI), PPVS (p-value = 0.026, One Way ANOVA test, 95% CI) of ' wide (p-value = 0.019, One Way ANOVA test, 95% CI) iMmodeLVmass (p-value = 0.021, One Way ANOVA test, 95% CI) thus, athletes with greater LV hypertrophy and greater LV indexed mass had a better response on anaerobic effort tests. There was a statistically significant association between FE3D and TTR respectively STT: TTR45calif and FE3D (p-value = 0.016, Chi2 test, 95% CI); STTcalif and FE3D (p-value = 0.044, Chi2 test, 95% CI).

DISCUSSIONS

Our study on LV function analysis using 2D and 3D echocardiographic methods in a batch of athletes showed several important aspects: athletes with more pronounced LV hypertrophy had a better response to the evaluation tests of anaerobic exercise (TTR was better as LV hypertrophy was higher). In addition, athletes who have achieved better ratings at evaluation tests of aerobic and anaerobic effort had a higher LV EF, evaluated with 3D echocardiography.

Another interesting finding in our study was the fact that there were no significant differences of 2D GLS respective 3D GLS between the two groups of athletes. This can be explained by the reality that in our team the defense line of athletes was not so different by the attack line and they all have both aerobe and anaerobe type of training protocols.

This aspect we consider that it is a limitation of our study, the relatively small number of analyzed athletes (in fact the entire lot of professional rugby union regional team) are not enough to constitute a homogeneous group in terms of the type of effort unfolded.

DÁndreea et al. studied the effects of different effort training protocols on LV strain indices. They showed no differences of 2D GLS between endurance and strength athletes. Also they demonstrated a positive association between E'lat, E'med and LVEDV (p-value<0.001) and an independent correlation between 2D GLS and sum of LV wall thickness (p-value<0.005) (16). In our study we also find a significant correlation of 2D GLS with IVS (p-value=0.035) and PW (p-value=0.002) thickness.

CONCLUSIONS

Our study demonstrated the importance of complete evaluation of the athletic heart using new echocardiographic technicque (3D echocardiography, Speckle tracking method) as well as the relationship of interdependence between 2D GLS, LV hypertrophy and the results to athlete's performance evaluation tests. Regarding myocardial deformation parameters, our study showed no statistically significant differences between 2D vs 3D GLS of the LV analyzed in this category of athletes.

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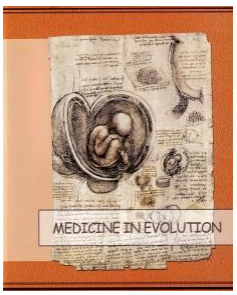
Clinical significance of articulator settings on occlusal morphology: a systematic review



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Abstract

Purpose. The purpose of this study was to systematically review the existing literature in order to identify the correlations between articulator settings and occlusal morphology.

Material and methods. The systematic literature review was conducted in accordance with the guidelines of the 2009 Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement for improving the quality of systematic reviews. An advancenced systematic search was conducted on PubMed/MEDLINE using specific keywords combination. Supplemental handsearch of additional articles was conducted in the table of content of The Journal of Prosthetic Dentistry for the following period: January 1965 through August 2016. Moreover, references for the selected articles were also screened in order to identify pertinent literature.

Results. The initial electronic search using the PubMed search engine and the specific search string yielded a total of 1509 article titles. After deduplication,"title and abstract" and "full-text" analysation of the list of articles, a total of 13 studies were selected for reviewing.

Conclusions. Generally we found agreement on the need to incorporate face-bow registration and articulator mounting for diagnostic and prosthesis fabrication procedures. Moreover, our findings suggest that there is still lack of agreement and limited available information regarding which articulator settings have the most influence on occlusal morphology. Research should be extended, using modern devices in order to clear aspects related to the temporomandibular joint, the use of articulators and their influence on occlusion.

Keywords. Dental articulator, articulator settings, occlusal morphology

INTRODUCTION

The temporomandibular joint and its correlation to occlusion and mandibular movements have long been studied by a vast number of authors[1]. Investigations of the temporomandibular joint led to the development of mechanical articulators and the simulation of mandibular movements.

Studies describe these effects as changes in cuspal inclination and groove morphology in relation to condylar settings, but little input is available regarding the magnitude of these changes and the articular settings that display the most influence[2,3,4]. The effect articulator settings have on occlusal morphology is reflected in the complexity of the occlusal adjustment a dentist is required to perform in order to occlusally integrate a prosthetic piece.

Authors agree that considering the physiologic mobility of healthy teeth of 0.5 mm, the upper limit for occlusal errors in fixed prosthodontics should not exceed 0.1 mm. Fox reports that the error in connection with fixed prosthodontics should lay between 0.05 mm and 0.075 mm[5]. It is widely accepted that the use of articulators in dental practice help in reaching these goals. Moreover, the use of a device that closely simulates the pacient's occlusal condition should result in a prosthesis that requires minimal chair-side adjustment, but still the use of an adjustable articulator remains not feasible for every restoration[6].

Aim

The aim of this paper was to systematically review the existing literature regarding the influence articulator settings exhibit on dental occlusal morphology.

MATERIAL AND METHODS

The systematic literature review was conducted in accordance with the guidelines of the 2009 Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement for improving the quality of systematic reviews[7].

The PICO (Patient-Intervention-Control-Outcome) question for this systematic review was as follows: *what influence do articulator settings exhibit on occlusal morphology of fabricated prosthetic pieces or teeth?*

An electronic search was performed using the PubMed search engine of MEDLINE (Pubmed) database by one reviewer.

The specific keywords used for the advanced electronic search were as follows: a combination of Medical Subject Headings (MeSH) terms and free-text words in conjunction with Boolean operators ("AND", "OR", "NOT"). The search string that was used was the following: ((dental articulator OR articulator settings) AND (occlusal morphology OR occlusal OR occlusal error OR occlusal tracing)).

In addition to the MeSH inclusion criteria, the following inclusion criteria had to be met: articles were written in English, articles described at least one articulator setting and its influence on occlusal anatomy, in vitro or in vivo studies, quantitative or qualitative results provided. Letters to the editor, monographs, expert opinions, animal studies, cadaver studies or articles that did not permit data extraction were excluded.

The electronic search was conducted in a systematic manner in 3 stages: titles, abstracts, and full text articles. In stage 1, a record of titles was acquired from PubMed/MEDLINE and all relevant resulted articles were analyzed. During stage 2, the investigator analyzed the abstracts of the articles that were selected in stage one. In uncertain situations the abstract was included in the subsequent stage of analysis. In stage 3, all articles were analyzed full-text and were subject to extraction of qualitative and quantitative data. The situations of uncertainty regarding application of exclusion criteria of the selected titles were checked for agreement with a second investigator.

Supplemental handsearch of additional articles was conducted in the table of content of The Journal of Prosthetic Dentistry for the following period: January 1965 through August 2016. Moreover, references for the selected articles were also screened in order to identify pertinent literature.

Lists of studies were collected and de-duplicated using EndNote X8 (Clarivate Analytics).

Content of studies identified using the above-described protocol were subject to data extraction. Data collection was performed using a standardized electronic spreadsheet. The following information were extracted: first author's name, year of publication, journal name, the articulator setting that was subject to the study, results. Data extraction was performed by one reviewer, cases of uncertainty were resolved by discussion with a second reviewer.

RESULTS

The initial electronic search using the PubMed search engine and the specific search string yielded a total of 1509 article titles. A supplementary manual search was conducted in the Journal of Prosthetic Dentistry for articles published after January 1965, resulting in 63 titles that were taken in consideration. Fig. 1 presents the flowchart of the study selection process.

Articles were de-duplicated, resulting in a number of 1469 records. The resulted 1469 articles underwent "title and abstract" screening, resulting in a further exclusion of 1407 articles. From the remaining 62 articles that were retrieved for full-text assessment, another 49 articles were excluded, resulting in a total of 13 studies that were used for data extraction and detailed analysis.

A variety of articulator settings were described: characteristics of condyle housing walls, intercondylar width, immediate side shift, progressive side shift, condylar angle, Bennett angle, hinge axis location, incisal guide angle and Bennett movement.

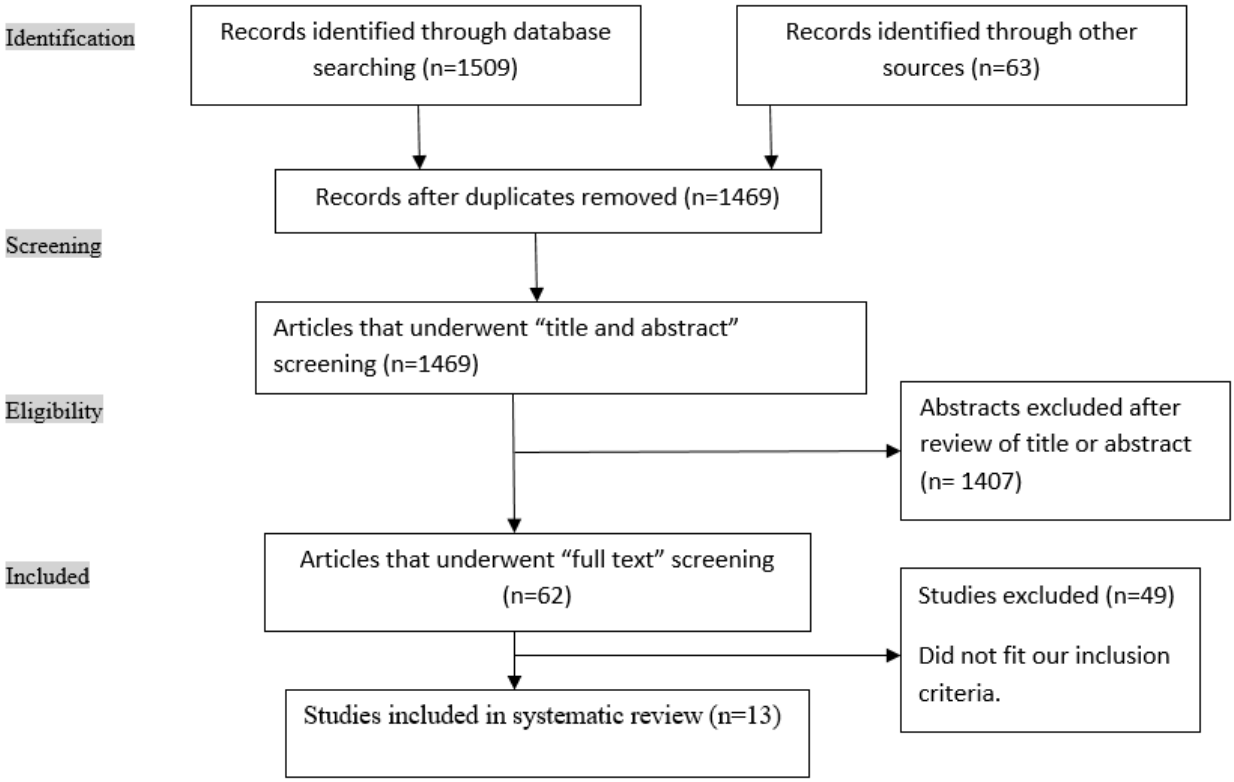

Figure 1. Diagram of selected studies for systematic review

DISCUSSIONS

This systematic review aimed to find correlations between different articulator settings and occlusal morphology in the existing literature. The role of articulators in prosthodontics is to transfer the exact mandibular movements of the patient to the articulator mounted dental casts, leading further to accurate prosthesis fabrication. Accuracy in prosthesis fabrication is correlated with less chairside time spent in order to achieve static and dynamic occlusal balance.

Bellanti investigated the significance of adjustable and semi-adjustable articulator capabilities, measuring the effects of intercondylar width, timing of the progressive side shift, shape of the condylar housing, direction of the side shift and the immediate side shift on occlusal morphology[8]. Variations in all of the above articulator settings lead to occlusal errors, requiring more than minimal intraoral adjustment of prosthesis in eccentric positions[8].

Scott reports that changing the hinge axis location distally and/or superiorly within a 12,5 mm range has very little effect on cusp configuration, if the vertical dimension of occlusion is unaltered[9]. Computerized investigations lead by Morneburg and Proschel, also found that arbitrary face-bow hinge axis transfer is sufficient if changes in vertical dimensions are limited to 2 mm[10]. When vertical adjustments exceed 4 mm they find it useful to determine the true hinge axis in order to transfer and mount the casts.

Piehslinger et al find that hinge axis shifts of 5 mm cause occlusal errors greater than 0,1 mm and that the occlusal errors are proportional to the shift or tilting of the hinge axis in millimeters or degrees. Piehslinger also finds correlation between the distance from the reference point to the hinge axis[11].

Scott also reports that condylar guidance has less influence on cusp angulation in comparison with incisal guidance and other occlusal determinants[9]. This finding is similar to Bellanti's conclusion in which he finds that curved superior walls reflected in 0,1 mm longer cusps on the working side and 0,2 mm shorter cusps on the nonworking side, effects that were considered within the clinically correctable range[8]. Aull studies the condylar determinants of occlusal patterns using a pantographic occlusal tracing device. His findings suggest that increased steepness of the eminences reflect in steeper sloping cusps on the non-working side, the cusp point tracings on the working side being less affected than the cusps on the non-working side. Aull also investigates the effects of the curvature eminence, concluding that increasing the curvature of the eminences has the same effect on the occlusal tracings as if the slant of the eminences are increased[12].

Schulte et all analyzed the movement of the mesio-lingual cusp of the maxillary left first molar in frontal and horizontal planes, using a computer program based on a three-dimensional mathematical model that allowed adjustments in the condylar and anterior guidance. Their results suggest that top wall inclination of the condylar housing influences significantly the movement of the analyzed cusp during working mandibular movement[13]. Meanwhile, rear wall inclincation influences less the working cusp movement. In another study, Price finds that changes in rear and top wall settings without an immediate side shift have no effect on occlusal anatomy[14].

Price also finds that condylar inclination adjustments influence more the non-working and protrusive cusp heights and less the non-working groove and ridge positions. Increased condylar inclination translated in increased in mandibular protrusive and non-working cusp heights[15].

In regard to incorporating the immediate side shift into articulator movements, Wachtel and Curtis found that elevating the value of ISS from 0.75 mm to 2 mm lead to increase of errors in frontal and horizontal planes, that consisted in positive errors at the level of the first molar, thus demonstrating the need for ISS setting in articulator programming[16].

Further studies of Curtis and Wachtel reported that adding ISS settings to semiadjustable articulators significantly improves accuracy in the horizontal plane and that

errors in the frontal plane emphasize the importance of the top wall setting. Errors in this study were smaller than in the previous study, but remained notable[17].

Price also studies the effects of ISS on generated occlusal tracings, concluding that elevations in the ISS value leads to modifications in occlusal molar anatomy: increased width of the central molar fossa, mesially positioned ridges and grooves for both excursions and increased mandibular non-working cusp height[14].

Mjor studied the general effect of lateral and horizontal condylar guidance on cusp morphology, using 15 degree pre-fabricated inserts. His results show that the effects of a 15 degree lateral condylar guidance on cusp inclination on both working and non-working side translated in cusps inclination that decreased posteriorly[18].

More recent studies use computerized technology and CAD/CAM systems for the purpose to analyze the effects of articulator variables on occlusal anatomy. Olthoff et al. analyzed the effects of six variables using high, medium and low values in comparison to average articulator settings. They found that the most occlusal correction was needed for ipsilateral settings of the following variables: Bennett side shift (1mm), Bennett movement (30 degrees) and sagittal condylar guidance (0 degrees).

Less recent studies of Price et al. found that the adjustments on the Denar SE articulator that required the least corrections on the first molar were: immediate side shift (0,2 mm), progressive side shift (5 degrees), intercondylar distance (5 mm), condylar inclination (5 degrees), rear wall (5 degrees) and top wall (5 degrees)[19].

Table I. Results. Abbreviations used: TW – top wall, RW – rear wall, WS – working side NWS – non-working side, ISS – immediate side shift, PSS – progressive side shift, CI – condylar inclination, HA – hinge axis

First author's name, year of publication	Journal name	Articulator setting	Results
Schulte JK, 1985	JPD	Working condyle top wall (TW) Working condyle rear wall (RW) Non-working condyle PSS (PSS) Right lateral incisal guidance (LIG)	1.TW inclination influences significantly the movement of ML cusp of maxillary first molar during working mandibular movement 2.RW inclination has less influence that TW settings
Bellati ND, 1973	JPD	Intercondylar width (1) Timing of PSS (2) Direction of SS (3) Shape of the condylar housing (4) ISS (5)	1.48 vs 51.5 mm IW reflected in 0.2 mm variance in MD cusp tip position on WS and NWS 2.62 vs 70 mm IW reflected in 0.2 mm variance in MD cusp tip position on WS and 0.5 mm position on NWS 3.early PSS effect on MD cusp tip is 0.1 mm on WS and 0.5 mm on NWS 4.altered direction of the SS reflected in changes that varied from 0 to 0.6 mm 5.a curved superior wall reflected in 0.1 mm longer cusp on WS and 0.2 mm shorter cusp on NWS 6.Steps of +2 mm in ISS reflected in changes that varied from 0 to 2.4 mm
Wachtel HC, 1987	JPD	ISS	1.The results of the study suggested the need for incorporating ISS into articulator movement 2.Increased errors in frontal or orizontal planes when ISS was elevated from 0.75 to 2 mm
Curtis DA, 1987	JPD	ISS	1.Adding ISS settings to a semi-adjustable articulator improves accuracy in horizontal plane 2.Errors in the frontal plane emphasize the importance of the top wall setting.
Proschel PA, 2000	Int J Pros	Average value articulator Condylar angle Bennett angle	1.Average value articulators were reflected in occlusal errors of 200µ in 16% of subjects and of 300µ in 6% of subjects 2.Additional registration of condylar angles– occlusal errors of 200µ in 13% of subjects and of 300µ of subjects 3.Additional seeting of Bennett angle – 1.6% and 0.1% of subjects 4.Complete mean value settings are associated with low risk of occlusal errors exceeding tolerance limits.
Morneburg TR, 2011	Clin Oral	Hinge axis (HA)	1.Absence of face-bow transfer and no VDO change – no occlusal discrepancies

First author's name, year of publication	Journal name	Articulator setting	Results
	Invest		2.VDO change <2 mm – face-bow transfer with arbitrary HA is recommended 3.VDO change >2 mm – transfer of true HA is recommended
Aull AE, 1965	JPD	The slant of the eminence (1) The curvature of the eminence (2) The amount of laterotrusion (3) The distribution of laterotrusion (4)	1.Steeper eminence reflected in steeper sloping cusps on the balancing side 2.Increased curvature of the eminence reflected in steeper sloping cusps 3.Increased laterotrusion requires shorter cusps 4.Laterotrusion accompanied by a downward movement of the rotating condyle calls for longer cusps on WS and NWS
Piehslinger E, 1995	JPD	The effect of arbitrary mounting of maxillary casts has on occlusal relationships	1.Use of arbitrary face-bow leads to deviations of occlusal contacts 2.Occlusal errors are proportional to the shift or tilting of the HA in mm or degrees 3.A 5 mm shift in the HA leads to an occlusal error greater than 0.1 mm 4.The height of centric record influences the occlusal precision: a 3 mm centric record leads to an occlusal deviation of 0.075 mm, meanwhile a >4.15 mm centric record leads to an occlusal error that is greater that 0.1 mm
Olthoff LW, 2002	J Oral Rehab	Saggital condylar (60°, 0°, 30°) Incisal guide angle (60°, 0°, 30°) Long centric articulation (1.2, 0, 0.6 mm) Bennett movement (laterotrusion: 30°, 0°, 15°) Bennett side-shift (laterotranslation: 1, 0, 0.5 mm) Wide centric (lateral intercuspal contact 0.6, 0, 0.3 mm)	1.Results showed that the most correction was needed for ipsilateral settings: Bennett side shift (1mm), Bennett movement (30°) and that Sag. Condylar guidance (0°) as well as the incisal angle (0°) – studied in bucco-lingual sections. 2.Bennett side shift on the contra-lateral side influenced the occlusal contour strongly, which could be seen in mesio-distal section. The ipso- and contralateral Bennett side shift influenced the occlusal anatomy more than other variables.
Scott, 1976	JPD	Condylar guidance Hinge axis location	1.Condylar guidance has less influence on cusp angulation in comparison to the incisal guidance 2.Changing the HA location 12.5mm distally and/or superiorly has little effect on the cuspal configuration
Mjor PS, 1965	JPD	Effect of end controlling guides on cusp inclination	1.In protrusive position cusp inclinations increased towards the steeper of the end controlling guides 2.The effect of 15 degree lateral condylar guidance on cusp inclination on the WS and NWS during lateral movements was a progressive reduction towards the back of the articulator
Price RB, 1991	JPD	Condylar inclination Progressive side shift	1.PSS settings influenced mostly the ridge and groove positions on the NW side 2.With increased PSS the mandibular NW ridge and groove positions moved medially and the NW cusp heights decreased 3.Condylar inclination settings a) did not affect the WS, b) influenced the NW and protrusive cusp heights, c) NW ridge and groove positions were less affected 4.With increased condylar inclination, the mandibular protrusive and NW cusps heights increased
Price RB, 1991	JPD	Immediate shide shift Intercondylar distance Rear and top wall settings	1.Increasing ISS lead to increasing width of the molar central fossa; increasing height of the mandibular NW cusp height; the mandibular ridge and groove positions moved mesially on both excursions; 2.Increased IC distance lead to increasing of the mandibular NW cusp height and diminishing of the fossa depth; moreover, the mandibular ridge and groove positions moved distally; 3.Changes in top wall settings in conjunction with no changes in ISS had no effect. 4.Changes in top wall setting in conjunction with changes in ISS lead to increased need of adjustment. 5.The adjustment with the least effect on the first molar occlusion were ISS (0.2 mm), PSS (5 degree), IC (5 mm), CI (5 degrees), rear wall (5 degrees) and top wall (5 degrees)

CONCLUSIONS

Generally, we found agreement on the need to incorporate face-bow registration and articulator mounting for diagnostic and prosthesis fabrication procedures. Moreover, our findings suggest that there is still lack of agreement and limited available information regarding which articulator settings have the most influence on occlusal morphology. Research should be extended, using modern devices in order to clear aspects related to the temporomandibular joint, the use of articulators and their influence on occlusion.

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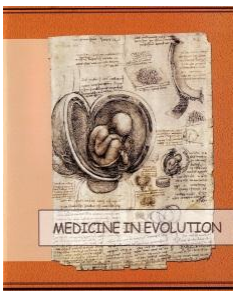
Inflammation in periodontal disease



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Abstract

The healthy periodontal tissue includes different cell types, such as fibroblasts, macrophages and inflammatory cells, connective tissue components (fibers and an extracellular matrix), and a rich microvasculature and neural complex. It is well known that periodontal disease is a chronic inflammation of the tooth supporting tissues, mainly caused by bacteria. When periodontal tissues are affected by inflammatory disease, they become the host of immune factors, which can destroy them. So, instead of eliminating the factor which produces harm to the tissue, the process becomes aggressive to the surrounding dental tissues. This paper aims to present the process of inflammation in periodontal disease and the role of anti-inflammatory medication in the process of inflammation.

Keywords: periodontitis, immune response, anti-inflammatories.

INTRODUCTION

Inflammation is a biological complex process represented by serial homeostatic adverse reactions toward the immune or non-immune aggressions. The inflammation has three stages. Acute inflammation is the initial response to tissue aggression and it is mediated by autocoid substances (histamine, bradykinin, prostaglandin etc.). The immune response is produced when the immune competent cells are activated as a response to the microorganisms or to the antigenic substances released during acute or chronic inflammatory answer. The result of the immune answer can be useful (the response can be the phagocytosis and neutralization of the invasive microorganisms) or it can be useless, inducing a chronic inflammation without healing. Chronic inflammation produces mediators release, such as interleukins 1, 2, 3, tumor necrosis factor alpha (TNFα), granulocyte-macrophage colony stimulating factor (GM-CSF), interferon etc. (Cristea 2006).

Periodontitis is an oral disease induced by bacteria which generate a periodontal tissue immunological response. Following bacterial colonization, the immune response consists of releasing immune factors which initiate tissue destruction. In the incipient stages of periodontitis, the collagen fibers are degraded by inflammatory cells. Destruction of periodontal ligament and bone occurs later, as the process becomes chronic (Cochran 2008). The main role in this process of collagen destruction is played by matrix metalloproteinases (MMPs) produced by fibroblasts. The destruction of the alveolar bone is influenced by the products of osteoclasts (interleukins, the activation factor of osteoclasts), as well as prostaglandins which have been always associated with this process (Haerian et al. 1996).

THE MECHANISMS OF INFLAMMATION

Inflammation produces cell damage which influences the leukocytes to produce lysosome enzymes, arachidonic acid. The arachidonic acid is metabolized by cyclooxygenase in prostaglandins, prostacyclins and thromboxane A2, and by 5-lypooxigenase in leukotriene (Graves & Cochran 2003).

In the first situation, the arachidonic acid mediates the prostaglandins synthesis especially prostaglandin H2, which is unstable and becomes precursor for thromboxanes, prostacyclins and other prostaglandins, such as prostaglandin E2 (PGE2), prostaglandin F2α (PGFα2). This process depends on the secretory cells: the mast cell produces prostaglandin D2, the vascular endothelium produces prostacyclin, the macrophage produces in a late phase PGE2, PGFα2. For the synthesis of prostaglandin, in this phase, it is necessary the cyclooxygenase, which can be found in the endoplasmic reticulum. Cyclooxygenase 1 (COX1) is found in the majority of the tissues as a constitutive enzyme; part of the eicosanoids produced are involved in homeostasis. Cyclooxygenase 2 (COX2) is induced by inflammatory cells which are stimulated by interleukin 1, bacterial lipopolysaccharide, and is in a close relationship with the inflammatory response in the periodontal tissue (Taubman et al. 2005).

Different factors involved in periodontal inflammation can stimulate the expression of these enzymes, accelerating or potentiating the arachidonic acid metabolism. One example can be interleukin 1β (IL1β), which produces growth of interleukin 6 and PGE2 via COX 2 (Cochran 2008).

In the second situation, the arachidonic acid is metabolized by 5-lypooxygenase, resulting leukotriene A2 (LTA2) - the precursor for leukotriene β4 (leukotriene β4 can be found in inflammatory exudates). Leukotriene β4 (LTβ4) produces adherence, chemotaxis and activation of neutrophil and macrophage, which stimulates the macrophage and lymphocyte production of cytokines. So, the production of interleukin 6 grows (Bascones 2007).

ANTI-INFLAMMATORY MEDICATION

There are two classes of anti-inflammatory medication: non-steroid and steroid. The steroid anti-inflammatory medication inhibits the production of arachidonic acid and its derivatives. The non-steroid anti-inflammatory medication locks the cyclooxygenase pathway, not affecting leukotriene production (Bascones 2007).

Non-steroid anti-inflammatory medication

Non-steroid anti-inflammatory medication (NSAIDs) are substances belonging to a medication class, which has the predominant action being anti-inflammatory and analgesic. The use of NSAIDs leads to the inhibition of PGE2 synthesis by the direct competitive or non-competitive inhibition of COX enzyme. There are two classes of non-steroid anti-inflammatory medication: non-selective (acetylsalicylic acid, indomethacin, ibuprofen, ketorolac, flurbiprofen) and selective on COX2 (rofecoxib, celecoxib) (Cristea 2006).

Several studies assessed the effects of NSAIDs on the periodontal disease. A study performed on 42 patients evaluated ketorolac mouthwash effects in gingival topical application for 6 weeks. The result of the study was that after 14 days a PGE2 reduction was noticed in the crevicular fluid (Preshaw et al. 1998). Another study evaluated the flurbiprofen effect after systemic administration in 21 patients. The study revealed that PGE2, thromboxane A2 levels were maintained constantly between the 29-th and 50-th day. The study was without clinical observation (Abramson et al. 1992). In 1996 some researchers studied the ibuprofen effects on 12 patients, for 2 weeks. The study was without clinical observation but they observed in the periodontal tissues high levels of PGE 2 and LTβ2 after surgery (O'Brien et al. 1996). In 1995, a study was done on 55 patients during 6 months. Radiographs were used to assess the effect of flurbiprofen and ketorolac on bone loss. In the ketorolac group the results were better than in flurbiprofen group (PGE2 decrease and reduced bone loss) (Jeffcoat et al. 1995). In 2002, a 30-day study was performed to test celecoxib effects on bone loss in periodontal disease. The results showed that celecoxib delayed bone loss, as compared to control group (Holzhausen et al. 2002).

Steroid anti-inflammatory medication

Glucocorticoids (dexamethasone, prednisone, prednisolone, hydrocortisone) are anti-inflammatories with small molecule, nonspecific immunosuppressive agents. This type of anti-inflammatory medication blocks the cell-mediated immune system at different levels. They act on the lymphocyte T producing the decrease of: interleukin 2 (IL2), interleukin 3 (IL3), interleukin 6 (IL6), TNFα, interferon gamma (IFNγ), GM-CSF, the number of circulating lymphocyte, the lymphocyte T proliferation. On monocyte they produce the decrease of: IL1β, IL6, GM-CSF, TNFα, the prostaglandin and leukotriene synthesis and liberation. Glucocorticoids act on endothelial cells producing the adhesion molecule (inter-cellular adhesion molecule 1 - ICAM1, and vascular cell adhesion molecule 1 - VCAM 1) and cytokines (IL1, GM-CSF) decrease, inhibiting the arachidonic acid metabolism. The action of glucosteroids on lymphocyte B, macrophage, denditric cells is to block the production of IL1, IL2 and TNFα transcription (Cristea 2006). Few studies were done on steroids anti-inflammatories medication's effects on periodontal disease. Earlier in 1950s, there was a study of the effect on the epithelium, basal membrane and connective tissue of small amounts of hydrocortisone injected into normal human oral mucosa. The result of the study was that no histological local changes were found, except a short-term reduction of the cellularity of connective tissue in the lamina propria (Krohn 1958). Another study, from 1980, was made on rabbits. They injected 3H-dexamethasone in the gingiva and then investigated radio-autographically. This investigation demonstrated the 3H-dexamethasone localization in the nuclei of target cells in the gingival epithelium, stroma and the walls of blood vessels. The results support the possibility that glucocorticoids may have a direct effect on specific hormone cytosol-nuclear receptors in the oral tissues (Tchernitchin et al. 1980). A study from 1960 was performed on patients who were receiving long-term corticosteroid treatment. It

was demonstrated that the effect of systemic steroids on inflammation and periodontal destruction was minimum in comparison with plaque control (Safkan & Knuuttila 1984). Another study made a comparison on renal transplant patients, patients on hemodialysis and healthy patients. The transplant group had better results on gingival inflammation, plaque accumulation and periodontal destruction scores (Kardachi & Newcomb 1978).

DISCUSSIONS

The etiology of periodontal disease is multifactorial, although the most important factor is represented by the bacteria. Substances released from biofilm, such as lipopolysaccharide, antigens and other virulent factors, penetrate the periodontal tissue. The response of the host immune system is represented by production of immune mediators which interact in the arachidonic acid metabolism (Yucel-Lindberg & Båge 2013).

The most important metabolite of the COX pathway and an important mediator of bone loss in periodontitis is represented by PGE 2. There are also some pro-inflammatory cytokines, such as TNFα, IL1β, IL6, IL8, ILf18, playing a significant role in the pathogenesis of soft and hard tissue destruction (Kinane & Buduneli 2011).

During initial stages of periodontal disease, the collagen fibers start to degrade. The inflammation cells release PGE2, which has the role to stimulate MMP production by fibroblasts (Cochran 2008). The family of MMPs, composed by a number of over 20 types, has the ability of degrading all components of extracellular matrix and basement membrane (Mc Crudden et al. 2016).

When inflammation becomes chronic, tissue degradation progresses into the periodontal ligament. Chronicity is caused by both exaggerate host immune activity and pathogenic factors activity. At this time, bone becomes affected. Some studies have shown the presence of PGE2 at this level, originating from the superficial tissue (Jönsson et al. 2011). If bone resorption is due to inflammatory causes, then a high concentration of inflammatory mediators must be present in the gingival tissue, penetrating and reaching within a critical distance to alveolar bone (Arron & Choi 2000).

Anti-inflammatories play an important role in inhibition of arachidonic acid metabolism, thus influencing inflammation and periodontal disease progression. Studies performed on NSAIDs have shown that the level of PGE2 decreased after their administration. The studies, in their majority were without clinical evidence (Bascones 2007).

A clinical study was made on 22 patients who had been taken NSAIDs for a year or more. There was a control group in which the patients were chosen to be the same age as the patients in the first group and with the same affection. The group who was taking NSAIDs had less gingival inflammation than the control group (Feldman et al. 1983).

The steroid anti-inflammatory medication is used on long term in patients with chronic inflammation diseases; its role is to inhibit the production of arachidonic acid and its derivatives (Safkan & Knuuttila 1984). The majority of the studies about steroid anti-inflammatory medication are clinical. With this respect, a study compared plaque scores and gingival indices in renal transplant patients taking immune-suppressants, and a control group. Both groups had similar scores, but the gingival index in renal transplant patients was significantly lower (Been & Engel 1982). A study performed in 1958 demonstrated reduction of inflammation and bleeding with no effect on the progression of periodontitis using topical gingival application of corticosteroids in periodontal disease (Krohn 1958).

CONCLUSIONS

The fact that periodontitis involves an inflammatory component provides a complex perspective on the etiology of the disease. In order to improve the periodontal status we must take into account not only the bacterial component, but also the host's immunologic response

to bacteria, which may cause more destruction than that caused by the bacteria and their by-products. Both families of anti-inflammatory medication play a role in the process of inflammation produced by the bacteria and the host immune system, each of them influencing a different part of the inflammatory process.

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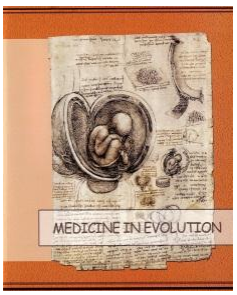
Complete oral rehabilitation, compromise between prosthetic plan and patient budget



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Abstract

This case report will show the possibilities of prosthetic treatment in edentulous situations treated improperly, patient accusing pain associated with requirements of an aesthetic nature, but does not have an unlimited budget. The situation, in fact quite common in many offices, forces us, in a professional, but especially moral choice, for treatment solutions to overcome the problems of the patient (pain, function and aesthetics), but not overwhelming him in financial terms.

This case presents a patient with multiple maxillary and mandibular partial edentulous, partial and incorrectly treated, who came to the office for an abscess at the lower right second bicuspid and also for pain in upper right quadrant, but then decided to have a complete rehabilitation and restoring old works, mainly for aesthetic reasons. The compromises we made in the office, parallel to the prosthetic solutions, due to the financial ability of patients, must not affect the case outcome.

Keywords: complete oral rehabilitation, compromise, prosthetic plan, patient budget.

INTRODUCTION

In every case, complete oral rehabilitation is regarded, from the patient point of view, to the following objectives (not particularly in this order):

- Pain relief
- Restoration of masticatory function
- Restoration of physiognomic function
- Low cost rate
- Short lead time

In most cases, there are multiple treatment options, and we, as doctors, are bound to present to the patient all of these possibilities, and choose one which fulfills most of the objectives presented above. Of course, we do this without compromising the medical prognosis of the rehabilitation.

CASE REPORT

This case report will present the possibility of prosthetic treatment in edentulous patient who does not have an unlimited budget. The situation, in fact quite common in many offices, forces us, in a professional, but especially moral choice, to approach treatment solutions which overcome the problems of the patient (pain, function and aesthetics), but not overwhelm him/her in financial terms.

Patient B.B., female, age 56, came to office accusing pain in lower right and upper right quadrants.

Clinical examination reveals a coronal vertical fracture on the tooth number 1.7., and an abscess at 4.5., in a patient with multiple edentulous situations, which were incorrectly treated, from aesthetic and functionality point of view:

On the maxilla, there were two partial physiognomic bridges (fixed partial dentures), one on the right side, from 1.3. to 1.6., with complete metal crowns both on the canine and first molar (fig.1), and one on the left side, from 2.3. to 2.6., same configuration, so completely unaesthetic.

Figure 1. Initial situation of the maxilla

Figure 2. Mandibular initial situation

On the mandibula, in the left quadrant, there was a 5 elements full metallic fixed partial denture, from 3.4. to 3.8., and on the right side, a joint full metallic two crowns work on 4.4. and 4.5., with two distal extensions (fig.2).

In our opinion, the mandibular fixed partial dentures were completely inadequate both from aesthetic and functional reasons, and proof for that was one of the reasons patient came for: abscessed 4.5., due to prosthetic overload.

Due to infection and the mobility of tooth 4.5., first approach was an antibiotic cure for 6 days, and extraction of affected tooth after 3 days of antibiotics (fig.3,4).

Figure 3. Ablation of FPD

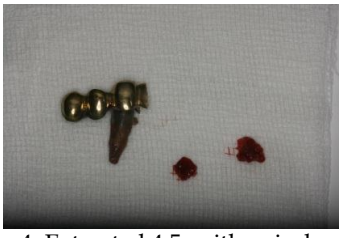

Figure 4. Extracted 4.5. with apical process

Also, extraction was the proper treatment for fractured 1.7. (fig.5)

Figure 5. Fragment of extracted tooth 1.7

Figure 6. Situation after extractions

After one month pause for sockets healing, patient was called for checking. At this time, she mentioned that she wants to change all fixed partial dentures due to aesthetic reasons (unaesthetic metal visible, gingival retraction and coloration) (fig.6).

With initial situation as described above and presented in picture (fig.6), patient was told about treatment possibilities, which, in our opinion, were:

- Implants in all quadrants with over-structure of metal-ceramic or all-ceramic crowns, combined with same type of crowns on remaining prepared teeth
- Aesthetic fixed partial dentures in maxilla (two metal-ceramic FPDs, from 1.3. to 1.8., including 1.6., and from 2.3. to 2.6.) and mobile partial skeletal denture on the mandibular site, in association with proper metal-ceramic crowns on the teeth facing the edentulous zones.

Due to financial and time nature difficulties, patient approved the second variant. First, we proceed with old FPDs removal (fig.7), after which, clinical examination revealed gingival trauma and affected teeth (fig.8,9)

Figure 7. Ablation of old FPDs

Figure 8. Gingiva affected by the inappropriate FPD

Figure 9. 2.6. with cavity

A root canal treatment was necessary on tooth 2.6. due to a profound cavity with pulpitis symptoms (fig.10-12).

Figure 10. Cavity on 2.6.

Figure 11. Access to root canals

Figure 12. Root canals filling

Endodontic treatment was carried out with ProTaper® - Dentsply Maillefer rotary instruments (fig.11). Root filling was carried out with VDW`s BeeFill®, using crown-down condensation technique (fig.12). Tooth was reconstructed afterwards with glass-ionomer cement (Kavitan Plus® - SpofaDental) (fig.13).

Next appointment we made teeth preparation, anatomic with chamfrein gingival preparation in all teeth, except 1.8. and 3.8., which remained full metallic, for conservative considerations (fig.13-15).

Figure 13. Glassionomer filling on 2.6. and teeth preparation

Impressions were taken with Elite®HDPlus – Zhermack putty and light body material, using double time wash technique (fig.14,15). A preliminary impression of mandibula (Hydrogum® - Zhermack, fast set) was taken in order to obtain the individual tray for functional impression (fig.16).

Figure 14. Maxillary impression

Figure 15. Mandibular impression

Figure 16. Preliminary impression

Following appointment was for FPDs and crowns metal skeleton try-in (fig.17), and color choosing by pictures, after cleaning and polishing the remaining teeth (fig.18).

Figure 17. Metal skeletons try-in

Figure 18. Color choosing

Then, next day, we did the dentine try-in for the maxillary FPDs (fig.19), and we took the functional impression on the mandibular site, with crowns in place, dentine on, in order to make the skeleton for the partial denture (fig.20).

Figure 19. Dentine try-in

Figure 20. Functional impression

Cementation of both maxillary FPDs with MaxCem Elite® - Kerr occurred next (fig.21).

Figure 21. Intra-oral aspect of maxillary fixed partial dentures

Following appointment (after two days) was the try-in of the metallic skeleton of the mandibular partial denture, and the registration of inter-maxillary relations (fig.22).

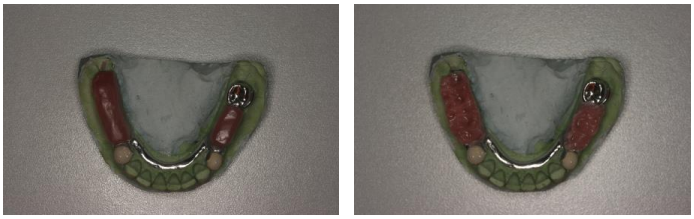

Figure 22. Inter-maxillary relations registration

After another four days, the wax model of partial denture was tried in (fig.23,24), and the next day all dentures were ready to be fixed and partial denture applied (fig.25,26).

Figure 23. Extra-oral try-in of mobile skeletal partial denture

Figure 24. Intra-oral try-in of mobile skeletal partial denture

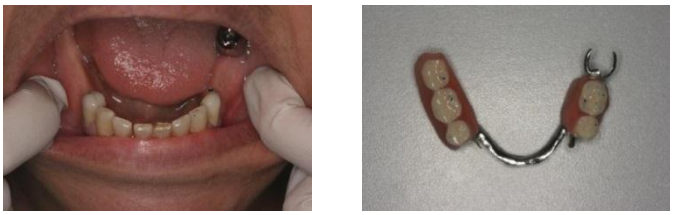

Figure 25. Cementation of fixed elements and final aspect of partial dentures

Figure 26. Final aspect of the complete rehabilitation

After one day of accommodation, we recall the patient for checking the adaptation of the partial denture and the inter-maxillary oclusal relations (fig.27).

Figure 27. Oclusal contacts check after one day

DISCUSSIONS

Figure 28. Criteria

As mentioned in introduction, patients are concerned more often about the cost of a treatment, the time involved in doing it and how long will the prosthetic work last. But, in reality, all of the criteria "fast", "good" and "cheap" does never coexist (fig.28).

So, we are forced to make a compromise between functionality, aesthetic and financial possibilities of the patient, as the patient decided to have a complete rehabilitation and restoring old works, mainly for aesthetic reasons.

Prosthetic rehabilitation possibilities always include most expensive treatment option like implants. It is known that extraction is followed by bone resumption (1,2). In this case,

extraction of tooth 4.5. raised the possibility of immediate implant placement. Literature had suggested that immediate implant placement in extraction socket will prevent bone loss (3-6), but there are human (7) and animal (8,9) studies which belied these affirmations. Also, the time necessary till prosthetic, after implant placement, would have been too long, so, in this case, immediate implant placement in 4.5. socket would have been unjustified, in terms of predictability and time. The cost of implant surgery would also have been too high for our patient to sustain.

Therefore, the combined fix – mobile prosthetic solution provided was satisfying for the patient in terms of time, costs and aesthetic.

The metal-ceramic fixed partial dentures offers resistance and long term life. There are studies which report a 93% rate of success at 10 years period (10) and a 79% rate for an 18 to 23 years period [11].

Two months passed from the first appointment to the last one, was an acceptable time table for the patient. Aesthetic aspect of the rehabilitation was satisfactorily. Functionality of dento-maxillary apparatus was fully restored. We have reached all these at a reasonable cost for the patient, in comparison to other prosthetic treatment options. The relationship with the patient is actually an internal cabinet rule, or habit and not a imposed way of management [12]. In the management of date patients in the dental office is necessary to try to go more in the electronic dental record field because the management of the patients will be better and this will improve the communication skills.[13]

A good prevention and treatment is accomplished by conducting a thorough medical history of the patients.[14]

When the patient is coming to medical services, he expects primarily to be heard, understood and not necessarily just a good service that is considered something usual and normal.[15]

In conclusion, we can always reach a prosthetic solution that does not force the patient to use solutions such as bank loans to pay for the work, but at the same time do not affect the rehabilitation prognosis. The case is also one which refers to interdisciplinary work, showing the need for knowledge from various specialties of dentistry, or collaboration with specialists in the respective fields.

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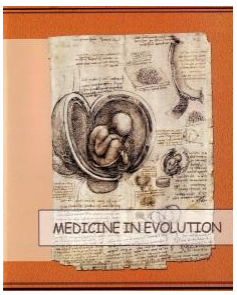
Clinical statistical study on the performance of posterior composite resin restaurations using direct, semidirect and indirect technics



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Abstract

Objectives: The aim of this study is to comparatively assess, by means of FDI evaluation criteria, the clinical performance of direct (DR), semidirect (SDR) and indirect restorations (IR) made with resine composite.

Material and methods: The study was conducted on 90 patients, 30 of which have received the DR, another 30 the SDR and 30 the indirect IR. Admira Fusion and Admira Extra (Voco) has been used to achieve direct respectively, semidirect restaurations. Indirect treatments consisted of composite inlays, made by Nexco (Ivoclar). The evaluation was performed at 6, 12 and 18 months.

Results: At 6 and 12 month evaluation, that there is no significant differences between the 3 groups. At 18 months evaluation, there was no significant difference between the SDR and the IR groups regarding the proximal and marginal adaptation, but significant difference has been noticed between DR and SDR and also between IR and DR (p=0.037 respectively p=0.047). Regarding the wear, significant difference has been noticed between IR and DR (p=0.016).

Conclusions: DR by means of nano-ORMOCER Admira Fusion and Futurabond U adhesive system, made in compliance with the clinical preparation and restoration protocol may be a viable option for restoring posterior proximal caries, however, at 18 months evaluation, IR and SDR have superior performance compared to DR.

Key words: proximal caries, direct restoration, semidirect restoration, inlay

INTRODUCTION

Dental restorations can be performed by direct techniques, with immediate results and by indirect techniques, which are more efficient in terms of time resistance, but more laborious from the technical point of view.

Composite resins are used for direct restorations, but the polymerization shrinkage is their main disadvantage because it causes defects at the interface dental structure / restoration material, as well as the appearance of marginal microleakage that causes secondary caries or postoperative pain. Along with this shortcoming, direct composite restoration shows difficulties in establishing the correct anatomical shape, as well as the proximal and occlusal contacts.

To counteract these disadvantages of the composites, a new nanohybrid composite appeared, called ORMOCER® (ORganic MOdified CERamic) Admira Fusion, which has silicon oxide as the basic chemical compound included both in the filler and in the organic matrix. This composition results in ceramic-like effects, which improvs aesthetics through color stability, and provide an ideal balance between translucency and opacity, but also a 50% lower polymerization shrinkage (1.25% by volume) compared to conventional composites, a 50% less shrinkage stress, high surface hardness (contains 84% inorganic filler (in wt)) and marginal resistance [1].

Depending on the execution technique, the inlay, which is the method used for IR of the posterior dental area, can be achieved by the SDR (it benefits from additional photothermal treatment) and the IR (in the laboratory).

By using IR systems, some limitations of DR can be overcome, such as the reduction of shrinkage by additional the polymerization of the prosthetic piece outside the mouth and also a more effective proximal adaptation.

The evaluation of the clinical performance of restorations is assessed by the FDI criteria described by Hickel et al. which are organized in three groups: aesthetic criteria (four parameters), functional criteria (six parameters) and biological criteria (six parameters). Each parameter can be expressed with five scores, three for acceptable and two for non-acceptable (one for reparable [Score 4] and one for replacement [5 score]). [2]

The aim of this study is to compare the clinical evaluation by means of the FDI assessment criteria, the clinical performance at 6, 12 and 18 months of direct (DR), semidirect (SDR) and indirect (IR) restorations made with composite materials and applied in the posterior dental area.

MATERIAL AND METHODS

The study group comprised of 90 patients, 30 of whom had DR, 30 IR and 30 SDR. The choice of the therapeutic solution depended on the size of the carious process: the medium-sized cavities received from DR, and the deep ones SDR and IR.

A protocol established according to the rules of conservative therapy was used to obtain the cavities, and the restorations were done according to the indications provided by the producers of the materials that have been used. These cavities included in this study were limited to two dental surfaces, mesio-occlusal or disto-occlusal ones, and the extension of the carious process on other surfaces was an elimination criterion from the study group. Direct and semi-direct restorations were made with Admira Fusion (Voco).

Indirect restorations consisted of composite inlays made with Nexco (Ivvoclar). For cementation, Varilonik II (Ivoclar Vivadent) was used (table I).

Table I. Materials used in the study

Materials and brand	Composition	Manufacturer
Admira Fusion (Voco)	Matrix: resine Ormocer Fillers: silicon oxide nano filler, glass ceramics filler (1μm)	Nanohibrid Ormocer
Futurabond U (Voco)	Liquid 1: HEMA, Bis-GMA, UDMA, HEDMA Catalyst Liquid 2: ethanol, initiator, catalyst	Adhesiv universal dual curing
Ionoseal (Voco GMBH, Cuxhaven, Germany)	Mixture of different dimethacrylates(Bis_GMA, UDMA), silicates, pigments and catalyst system	Liner Glass Ionomer
Septocal LC	Calcium hidroxiapatita paste, fluor, bariu sulphat	Hydroxide Calcium Cement
Varilonik II (Ivoclar Vivadent)	Matrix: Bis-GMA, urethane dimethacrilate, trietilen glicoldimethacrilate Fillers: ytterbium trifluoride dibenzoil peroxide	Dual-curing resin based dental luting material
SR Nexco®(IVOCLAR).	Aromatic aliphatic UDMA + Aliphatic dimethacrylates Highly dispersed silicon dioxide Copolymer Catalysts and stabilizers Pigments	Light Curing ONLY Systems

THERAPEUTIC PROTOCOL

Following patient information and consent, the treatment was performed by a single operator using standard protocols and manufacturers' indications. As required by each case, occlusal contact areas were marked with the 40 μ Bausch articulating paper. The pulp vitality of the teeth has been established by means of complementary tests.

Direct restorations (DR) were made after airflow and professional brushing and isolation with the flexible separator Optra-Gate (Ivoclar-Vivadent) associated with the saliva vacuum cleaner.

Cavity preparation was performed by removing the dentine with the round bur at low-speed and finishing the enamel edges of the axial walls and the supragingival wall (which is situated supragingivally) with the pyrimform-shape burs. Then, with the help of an ultraviolet lamp Diagnostikset, the dentinal surface was checked. In the deep cavities, pulp protection was achieved by using a light-cure glass ionomer liner (Ionosil Voco). For the restoration of the proximal wall, Striproll cellulose matrix (Kerrhawe, Bioggio, Switzerland) and anatomically shaped port matrix were used; reflective plastic wedges were inserted in the buccal-oral direction (Clear fine). Selective etching of the enamel was performed using 37% phosphoric acid, then the Futurabond U (Voco) adhesive system was used. The restorations were realised by layering Admira Fusion (Voco). The contact point was restored with Optra Contact and the light-curing was achieved by means of LED Elipar TM (3 M ESPE) light-curing lamp which has a light intensity of 1200mW / cm2, a 10mm optic fiber, which increases by 80% the surface illumination and the curing time was 5 seconds. Polishing of occlusal surfaces was done with Occlubrush (Kerr, Orange, CA, USA) silicone brushes with cup or cone shape, abrasive strips Roeko (Coltene-Whaledent, Langenau, Germany) were used for proximal surfaces and for the rest of the accessible surfaces, polishing was achieved with Soft-Lex extra-fine discs.

The correct contact point tension and proximal surface smoothness were checked using Essential Floss (Oral-B) dental floss.

Occlusal adaptation and interferences in propulsion were checked with articulating paper.

Indirect restorations (IR) were performed after evaluation of the occlusion by removing the carious tissues with a round bur and manual instrument; the axial walls were placed in relation to the extension of the carious process with slightly divergent direction

toward the occlusal surface (angles of 5°-10°) and were smoothed with a diamond flame-shaped bur. The internal angles were rounded with a round bur and the gingival wall is located supragingivally to allow cementation under perfect drying conditions.

The finishing phase of the entire circumference of the preparation is done with fine conical or diamond flame burs at low speed. Dental pulp was protected with a CIS glass-ionomer liner (Ionosil Voco), a silicone was used for impression, and after lubrication (Rubber Sep - Kerr Dental), restoration was done by layering the composite material (Nexco). The restoration was introduced for additional heat treatment in the oven and subjected to the regime/treatment provided by the manufacturer.

The inlay preparation consisted of sandblasting, application of hydrofluoric acid on the internal surface and washing, and then silane application and washing. The preparation was subjected to the adhesive technique then luting cement was applied (Varilonik II, Ivoclar Vivadent), followed by light-curing for 120 s.(40 s. for each of the buccal, oral and occlusal areas).

Semi-direct restorations (SDR) followed the next steps: cavity preparation according to the same rules as the indirect method, dental pulp protection, matrix and wedge application, insertion of 4 mm bulk of Admira Fusion X-tra (Voco) after lubrication of the preparation in order to allow its removal from the cavity and, finally, its modeling followed by light-curing. The piece was light-cured outside the mouth for another 60 seconds, then heat and photothermic treatment in the oven at 123° for 5 minutes (Spectramat Ivoclar Vivadent AG) was applied. After applying the adhesive protocol to the enamel edge of the preparation, the luting was done.

Clinical results were evaluated at 6, 12 and 18 months respectively, on six of the 16 parameters described in the FDI criteria: marginal adaptation (II.6), proximal adaptation-contact point (II.8a), wear (II.7) III. Biological properties: secondary caries (tabel II).

Table II. Criteria and FDI scores used in the study

Criteria	**Scor 1 Clinically excellent / very good**	**Scor 2 Clinically good (after polishing very good)**	**Scor 3 Clinically sufficient / satisfactory**	**Scor 4 Clinically unsatis-factory (but repairable)**	**Scor 5 Clinically poor (replacement necessary)**
Luster	Luster comparable to enamel.	Slightly dull, not noticeable from speaking distance. Some isolated pores	Dull surface but acceptable if covered with film of saliva. Multiple pores on more than one third of the surface	Rough surface, cannot be masked by saliva film, simple polishing is not sufficient. Further intervention necessary. Voids	Quite rough, unacceptable plaque retentive surface.
Marginal Staining	No marginal staining	Minor marginal staining, easily removable	Moderate marginal staining, not aesthetically unacceptable.	Pronounced marginal staining; major intervention necessary for improvement.	Deep marginal staining, not accessible for intervention
Marginal Adaptation	Harmoniou s outline, no gaps, no white lines	Marginal gap (<150 µm), white lines Gap < 250 µm not removable.	Gap < 250 µm not removable.	Gap > 250 µm or dentine/base exposed.	Filling (complete or partial) is loose but in situ.
Proximal Adaptation	Normal contact point (floss or 25 µm metal blade can pass)	Slightly too strong but no disadvantage (floss or 25 µm metal blade can only pass with pressure).	Slightly too weak, no indication of damage to tooth, gingiva or periodontal structures (50 µm metal blade can pass) Repair possible	Too weak and possible damage (food impaction) (100 µm metal blade can pass)	Too weak and/or clear damage (food impaction) and/or pain/gingivitis. Requires replacement

Criteria	Scor 1 Clinically excellent / very good	Scor 2 Clinically good (after polishing very good)	Scor 3 Clinically sufficient / satisfactory	Scor 4 Clinically unsatis-factory (but repairable)	Scor 5 Clinically poor (replacement necessary)
Recurent caries	No secondary or primary caries	Very small and localized demineralization or erosion	Larger areas of Demineralisation, erosion Only preventive measures necessary (dentine not exposed	Caries with cavitation or suspected undermining caries Localized and accessible and can be repaired.	Deep caries or exposed dentine that is not accessible for repair of restoration.
Wear	Physiologic al wear equivalent to enamel (80-120% of correspondi ng enamel).	Normal wear with only slight difference to enamel (50-80% or 120-150 % of corresponding enamel).	Differing wear rate to enamel but within the biological variation (< 50 % or 150-300 % of corresponding enamel)	Wear considerably exceeds normal enamel wear; or occlusal contact points are lost (restoration > 300 % of enamel	Wear is excessive (restoration > 500 % of corresponding enamel).

The statistical analysis was performed with the Windows software (SPSS) 13.0, and Anova and Tukey HSDa tests were used to determine the significant difference between the three analyzed groups. A threshold of statistical significance of at least 95% (p = 0.05) was established, which is accepted as sufficiently precise by most statistical studies in the medical field.

RESULTS

The evaluation of the parameters of the three methods of restoration of the proximal caries was performed according to FDI criteria. The results of the evaluation at 6, 12 months and 18 months are presented in Fig. 1-6.

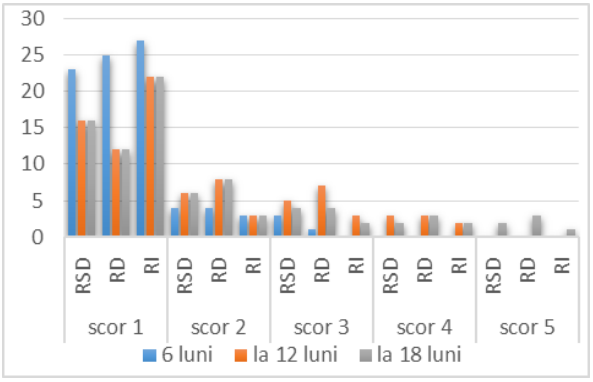

Figure 1. Luster

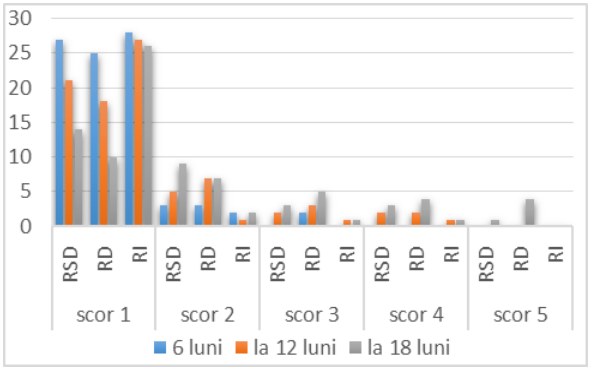

Figure 2. Proximal adaptation

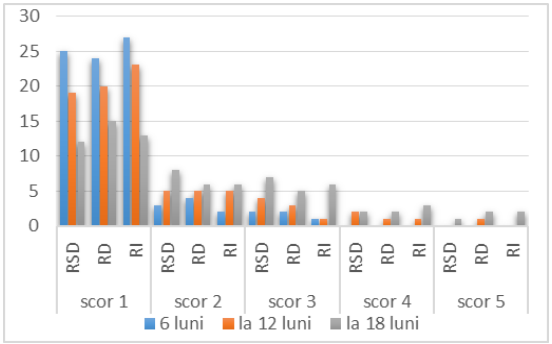

Figure 3. Marginal adaptation

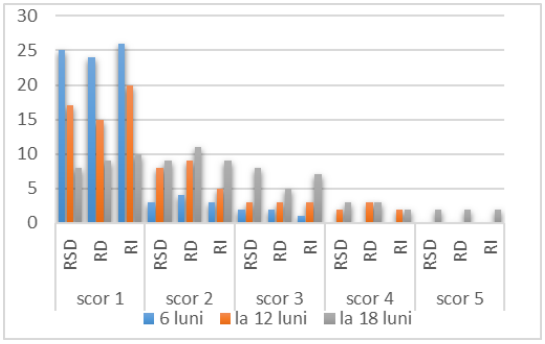

Figure 4. Marginal staining

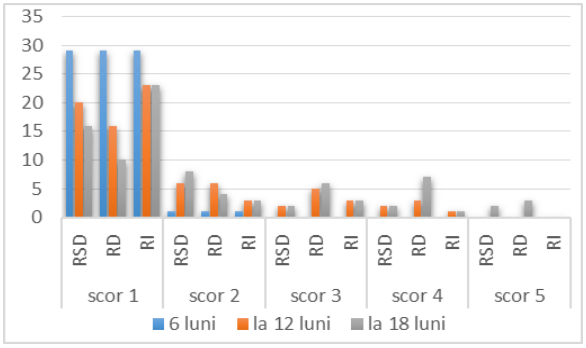

Figure 5. Recurent caries

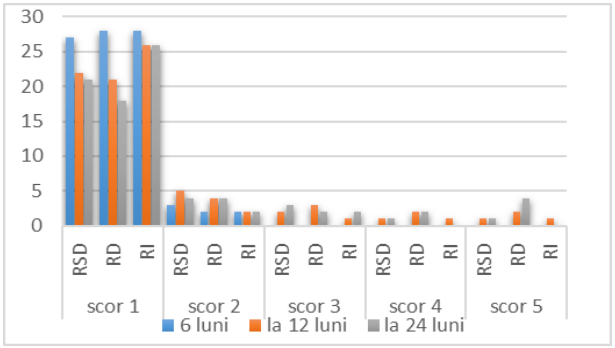

Figure 6. Wear

At 6 months, changes in all parameters analyzed for clinical evaluation of restorations made by direct, semi-direct and indirect adhesive techniques did not show statistically significant differences. In DR and SDR, there were no scores of 4 and 5 for any parameter, and the marginal secondary caries and wear presented only scores 1 and 2. IR did not show scores of 3, 4 and 5 for any parameters, except for adaptation and marginal coloring.

At 12 months no scores of 5 were found for any parameter. It is noted that DR have scores closer to SDR and IR show superior performance compared to DR and SDR, but no statistically significant differences. The largest differences between the three types of restorations were for the proximal adaptation, so the 1 score at DR was present in 18 patients compared to 27 at IR.

At 18 months, the shine of direct restorations was rated 1 to 40%, 53% for SDR, and 73% for IR. In terms of the proximal adaptation, 87% of the indirect restorations showed the score 1, while DR had 33%. The marginal secondary caries presented score 1 at 33% of DR and 77% at IR. Wear score 1 is presented at 60% DR, 70% SDR and 87% IR.

In terms of scores 4 and 5, therefore unacceptable ones, they were found in SDR ranging between 3-13% and in IR with values ranging from 3-7% for all the analyzed parameters. DR showed values between 7-13%, except for the marginal secondary cavity that showed the score of 4 in 23%.

The statistical analysis indicated in the 18 months evaluation that there is no significant difference between RDD and RI in the proximal and marginal adjustment, but there are differences between RD and RSD ($p = 0.037$ respectively $p = 0.047$), as well as between RI and RD, while in the case of wear there are significant differences only between RI and RD ($p = 0.016$).

DISCUSSIONS

This study makes a comparative evaluation of different composite proximal restoration techniques (direct, semi-direct and indirect). Following a therapeutic protocol associated with the use of materials suitable for the restoration of the posterior teeth lead to the solving of functional and aesthetic problems encountered in restoring this area.

Solutions for the restoration of an extensive carious lesion situated in the posterior area do not vary extensively. Either we restore the tooth with a filling, or with an inlay. Both treatment solutions show the same problems: marginal sealing, achieving an occlusal relief and an optimal contact point, resistance of the restoration and of the tooth.

This study has attempted to monitor several aspects which occur in occluso-proximal restorations made by direct, semi-indirect and indirect techniques. The six parameters evaluated were gloss, marginal and proximal adaptation, marginal coloration, secondary caries and wear.

DR are commonly used in dental practices, 69% of patients benefit from direct restorations, half of which are class II restorations. In this study, for DR and SDR, we used the

recently-marketed Admira Fusion and Admira Fusion E-xtra that use nano-ormocer technology (2014). An ormocer is a hybrid molecular structure that combines organic and inorganic nanocomponents by the sol-gel method [3,4].

The adhesion was achieved with Futurabond U (Voco), a universal double-sided reinforced nano adhesive which was applied in a single layer, enough to get strong, microscopic bonding with the enamel and the dentin [5].

IR with composite resin is an attempt to overcome the polymerization shrinkage, the main disadvantage of the direct composite resin restorations. The secondary polymerization at high-temperature of the composite inlay increases the conversion rate and allows the appearance of the initial polymerization shrinkage and post-shock stress before the insertion of the inlay into the preparation [6]. Several studies in the literature compared the performance of direct and indirect restorations [7,8].

At the 6-month assessment, DR have almost similar values for all the analyzed parameters.

A recent study by Torres et al (2015) [9] evaluated the clinical performances of proximal restorations made with Admira Fusion and a nanohybrid composite and it showed that, at the 6- months assessment, the luster and marginal adaptation was maintained in 90% of cases, 80% showed proximal adaptation and 100% coronary integrity, 92% maintained marginal coloration. Given the limited duration of the assessment, this study can only be used as a guide.

Other recent studies have compared the susceptibility of ormocers to the action of coloring agents. [10]

In the study by Poggio et al., Admira Fusion showed similar values of coloristic stability to those of nanohybrid composites or microparticles. [11]

Studies have shown that at class II restorations, Ormocers have a polymerization shrinkage and microleakage smaller than composite resins. [12]

Also, Ajlouni et al. have noticed that ormocers "were more biocompatible and had a lower wear rate." The authors compared the shear resistance of an ormocer and a composite with Bis GMA matrix and did not find significant differences between the two materials [13].

Despite all these qualities attributed to ormocers, in this study the DR were inferior to SDR and IR at 18 months although at 6 and 12 months the differences were insignificant. At 12 months, the difference between the three therapeutic methods targeted all parameters analyzed without statistically significant differences. DR showed lower performance compared to SDR, and in particular IR, although score 5 was not noticed (remaking of the restoration) and score 4 was present in between 3% and 10% of the cases. There is an increase in the number of cases with scores of 2 and 3 falling within the acceptable clinical range. The greatest difference between DR and IR scores was found for the proximal and luster adjustment, with no statistically significant difference. ($P > 0.05$).

Marginal adaptation is a major criterion for the longevity of a restoration, since the lack of it can cause marginal coloration and, later on, secondary caries [14].

In this study, at the 18-month assessment, marginal adaptation was superior to IR compared to the other two therapeutic methods.

These results are consistent with Nurcan et al. (2013), who, in their study, showed that IR are superior to DR regarding the anatomical contour, marginal adaptation, marginal coloration, and postoperative sensitivity after three years of assessment [15]. According to other studies, DR and IR on the posterior teeth provide satisfactory clinical performance; the comparison between them shows no differences or they are insignificant [16].

Regarding the proximal contact point, the study demonstrated that SDR and IR are superior to the direct one. In proximal restorations, the tightness of the contact point also depends on the contraction of the composite material. Studies have shown that the reduced

polymerization shrinkage of the composite associated with the reduced intensity of the polymerization light corresponds to a proximal tight contact point. [17]

The wear rate of SDR and IR in this study showed a low value that falls within acceptable clinical limits at all assessment intervals. At the 18 months evaluation, the DR showed lower performance compared to SDR and IR. The study by Mendoca et al. has shown that DR and IR have a reduced wear rate after one year. [18]

Cetin AR et al. clinically evaluated direct vs. indirect restorations over a 5-year period and showed that the performance was clinically acceptable and there were no significant differences. [16]

Marginal staning is still a clinical issue related to the direct restoration, and aesthetic failure is one of the most common reasons for replacing restorations. In the study by Ijaimi Z.A. et al., marginal staning accounted for 15% of total restorations, and posterior proximal restorations had the highest unacceptable marginal integrity percent compared to other caries localization (20%) [19].

In this study, marginal staning did not show significant differences between the three groups in any of the analyzed period ($P = 0.754$ at 6 months, $p = 0.611$ at 12 months, $p = 0.181$ at 18 months). The result is in agreement with Karaarslan ES et al. who by comparing 5 composite resins showed that there are no significant differences between direct and indirect restorations [7].

The occurrence of recurent caries is to a certain extent determined by the type of the restoration material used, although its developmental mechanisms are probably multifactorial. The occurrence of gap in excess of 60 μm seems to cause demineralization and can lead to the occurence of caries. Initially, a gap may result from the polymerization contraction and the failure of the adhesive technique. In addition, the composites seem to favor the growth of cariogenic bacteria on their surface, which has been associated with specific surface properties and lack of antibacterial properties [20].

CONCLUSIONS

The direct restoration technique with nano-ORMOCER Admira Fusion and Futurabond U, performed in accordance with the clinical preparation and restoration protocol, can be a viable option for restoring posterior proximal caries. However, IR and IR have superior performance at 18 months in terms of proximal and marginal adaptation and wear.

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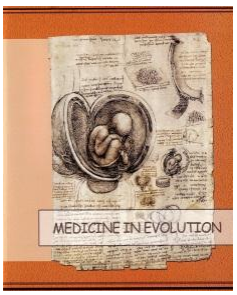
Changes of aesthetic characteristics in patients undergoing orthodontic treatment



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Abstract

Introduction: The multidisciplinary approach to aesthetic restorative treatment has become a common thing. However, the perception of dental aesthetics varies significantly from one dental specialty to the other, although significant efforts have been made to set common standards.

Case report: A 32-year-old female patient was introduced to the dentist's office to consult on the position of the teeth. She complains of an unsatisfactory aspect of the dental axes during smile, speech and a difficulty during hygiene, due to dental malposition. The patient has good hygiene. After the specialist consultation the patient underwent an orthodontic treatment in order to obtain a balanced and harmonious smile.

Conclusions: Most patients evaluate the quality of dental treatments after aesthetic changes occurring in the smile or teeth after treatment.

Keywords: Aesthetic area, GAL angle, GAL line, gingival height

INTRODUCTION

Obtaining a beautiful smile is always the main objective of any aesthetic dental treatment. After all, it is the beauty of smile that will make the difference between an acceptable or pleasing aesthetic result for any given treatment. Nevertheless, in spite of its importance, the intrinsic characteristics of the smile are little discussed. Much is said of the clinical consequences of dental procedures on the smile, but its intrinsic characteristics are not widley evaluated (1).

Evaluating beauty is always subjective. However, we need adequate tools to overcome the challenge of this subjectivity (2). In orthodontics, it is not enough only to recognize what is interfering with the smile, it is requires a diagnosis of what is not normal, in order to establish a treatment plan. Just as in functional problems, in wich we follow conducts that lead us to a diagnosis of the anomalies, aesthetic problems also require parameters so we can find the defects. When searching for the visualization of problems, several rules and assuptions are created, leading sometimes to an underestimation of defects or an overvaluing of rules, creating paradigms that are not supported by proven scientific data (3).

CASE PRESENTATION

A 32-year-old patient concerned with his physical and functional appearance at the mouth level, presented himself in the dental office accusing these complaints. Both, the aesthetic aspect and the difficulty of keeping a proper hygiene were a discomfort.

Intraoral clinical examination revealed an asymmetry marked at 1.1 and a pronounced malposition at this level. In the first quadrant, the patient presents a GAL class (gingival aesthetic line) 2, which means that the zenith of superior lateral incisor in the first quadrant is below the line that connects the zenith of the central incisor with the zenith of the canine on the same side. The GAL angle is greater than 90 degrees. In the second quadrant, the same GAL classes are present, but asymmetric reported to the facial midline. The vestibularization of 1.1 and dental crowding from the upper jaw did not allow the patient to have proper hygiene

The incisal line was reversed, unsightly situation, and contact points between 1.1 and neighboring teeth were non-existent. The dental axes had a chaotic appearance, not being parallel to each other, and without converting to incisal.

The patient underwent an orthodontic treatment, following which was corrected both the unsighting aspects and the functionality of the entire dento-maxillary apparatus.

Repositioning the dental elements followed their corresponding alignment and symmetry relative to the median line of the face

DISCUSSIONS

In recent years in dentistry there has been an increase in dental aesthetic surgery in both the teeth and gingival tissue. In addition to aesthetic considerations related to the intraoral aspect, in order to achieve a higher degree of patient satisfaction, it is necessary to evaluate both the smile and the quantification of the harmony between the components of the oral cavity and the smile.For this reason many patients evaluate the quality of dental treatments after aesthetic changes occurring in the smile or teeth after treatment (4).

Some authors consider that changes in the symmetry of the teeth are perceived differently by the patient and the dentist. Cosmetic aspects should be taken into account not only when treating tooth-modifying treatments but also treatments involving periodontal tissues trying to achieve the most attractive smile possible (5).

Figure 1. Initial situation, frontal view

Figure 2. initial situation, lateral view (right)

Figure 3. Initial situation, lateral view(left)

Figure 4. Occlusion after orthodontic treatment, lateral view

Figure 5. Final aspect, after orthodontic treatment, frontal view

CONCLUSIONS

Knowledge of intrinsec characteristics of the smile helps in the aesthetic perception of it.

Being able to evaluate the smile of each patient assures the professional of the possibility of seeing what needs to be done, what can be done, and what should be accepted. In other words, being able to interpret the nuances of a smile gives each dentist (orthodontist) the opportunity to act in a conscious manner in the mouth aesthetic treatment of their patients, allowing the diagnosis to be integrated with the prognosis and giving a realistic outlook of the results than can be obtained.

We know that observing the aesthetic lines is not enough to evaluate a smile. Several other factors also need to be taken in consideration. Buccal corrido, number of exposed teeth during smiling, frontal, oblique and profile facial analyses, relationship between resting and speech positions and the smile are some factores that should also be observed in order to achieve a better diagnosis of mouth aesthetics.

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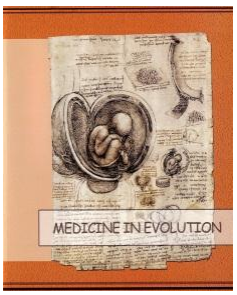
Prevalence of five periopathogens in patients with chronic periodontitis in western Romania



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Abstract

Aim and objectives: To determine the prevalence of five periopathogens: *Aggregatibacter actinomycetemcomitans, Porphyromonas gingivalis, Tanerella forsythensis, Treponema denticola* and *Prevotella intermedia (Aa, Pg, Pi, Tf* and *Td),* as well as their associations in patients with chronic periodontitis in a population in Western Romania.

Material and methods: The study included a number of 110 patients from Western Romania, among which 60 were diagnosed with periodontitis and 50 were periodontally and systemically healthy. The following parameters were recorded: plaque index, bleeding on probing, probing depth, level of epithelial attachment, number of absent teeth. Microbiological samples were also taken from the gingival sulcus in order to identify periodontal pathogens through the polymerase chain reaction (PCR).

Results: For *Porphyromonas gingivalis, Tanerella forsythensis, Treponema denticola* and *Prevotella intermedia*, the proportion of individuals in which the microbial species investigated were present was significantly higher for patients with chronic periodontitis than for control patients, but was not different between the groups with moderate and severe periodontitis. The detectability scores of the five bacteria were positively correlated, the highest positive correlations were found between *Porphyromonas gingivalis, Tanerella forsythensis* and *Treponema denticola*.

Conclusions: Evaluation of the prevalence of periopathogens using the PCR reaction is a precious aid in the diagnosis and treatment of chronic periodontitis in populations across geographical areas.

Keywords: chronic periodontitis, periopathogens, polymerase chain reaction.

INTRODUCTION

Chronic periodontitis (CP) is an infectious disease that consists in the inflammation of the support tissue of the tooth as well as in progressive loss of epithelial attachment. The etiology of this disease is multifactorial. The role of bacteria is important in its pathogenesis, albeit probably insufficient to cause periodontal disease, the onset of disease requiring also a host with increased susceptibility (1).

The gingival microbiome is organized in biofilms, colonizing the surface of teeth, above and beneath the gingival margin. Subgingivally, it can adhere to the internal epithelium of the gingival sulcus or to the exposed connective tissue. The microbial complexes interact with the host immediately after the initial contact until the lesion is initiated. Its debut is influenced by the simultaneous activity of multiple factors that initiate the disease and its progression: the virulence of periodontal pathogens, the local conditions and the susceptibility of the host. The periodontal pathogens best documented so far are *Aggregatibacter actinomycetemcomitans, Porphyromonas gingivalis, Tanerella forsythensis, Prevotella intermedia, Fusobacterium nucleatum, Campylobacter rectus, Eikenella corrodens, Peptosreptococcus micros, Eubacterium(2)*.

The presence of periodontal pathogens seems to cumulate with the immune response of the host, the result being the periodontal destruction. Classical experiments have shown that accumulation of bacterial plaque on dental surfaces results in an inflammatory gingival response in the adjacent gingiva, whereas removing the bacterial plaque leads to regression of symptoms of gingival inflammation (1). It is well-known nowadays that more than 500 various species can colonize the oral cavity, so that each individual may host up to 50-150 various species. (1)

Socransky's classic founding study (1998) examined 13,000 samples from the bacterial plaque, managing to isolate through the DNA hybridization technique 40 different microorganisms in patients with periodontal disease, at the same time accomplishing the codification of the 5 major "complexes" (3).

According to Ali's study in 1996, the first of this type on a population in Romania, with a total of 36 patients with moderate or severe chronic periodontitis treated in the Department of Odontology and Periodontology of the "Carol Davila" Faculty of Dentistry in Bucharest, *Porphyromonas gingivalis* was the most frequent periopathogen in the gingival sulcus, followed by *Prevotella intermedia, Fusobacterium nucleatum* and *Aggregatibacter actinomycetemcomitans*.

This study aims to analyze the quantitative determination of five periodontal pathogens, namely of the "purple" complex *Aggregatibacter actinomycetemcomitans,* of the "red" one *Porphyromonas gingivalis, Tanerella forsythensis, Treponema denticola,* and of the "yellow" one *Prevotella intermedia,* as well as their associations in patients with chronic periodontitis.

MATERIAL AND METHODS

This case-control study included 110 patients from the Western Romania, 60 out of them with chronic periodontitis (29 women) and 50 healthy periodontally healthy (32 women). Patients were selected and treated in the Department of Periodontology of the "Victor Babeş" University of Medicine and Pharmacy in Timisoara, between 2013 and 2016. Demographical data of the patients group are displayed in Table 1.

All participants signed an informed consent in which they acknowledged to participate in the study. The research was approved by the Research Ethics Commission of the University of Medicine and Pharmacy in Timisoara (No.10/2013), according to the Declaration of Helsinki.

The criteria of exclusion were: diabetes, hepatitis, HIV, malignant tumors, prolonged treatment with anti-inflammatory drugs, immunosuppressive drugs, pregnancy and lactation.

Patients were examined by two specialists (DR, DM). A Williams probe with gradations at 1, 2, 3, 5, 7, 9 and 10 mm was used. The periodontal parameters recorded were: the plaque index (PI, Silness & Loë 1964); the full-mouth bleeding on probing score (BOP); the probing depth (PD), which was recorded as the mean overall value (mean PD) and the maximum PD value of the mouth (maxPD); the gingival clinical attachment level (CAL); the number of absent teeth (AT). Clinical measurements were performed at six sites per tooth (mesio-buccal, mid-buccal, disto-buccal, mesio-lingual, mid-lingual, and disto-lingual). All data were recorded on the online periodontal chart of the Department of Periodontology of the University of Bern (http://www.periodontalchart-online.com/ro/).

The diagnosis of CP was established based on the criteria listed by the International Workshop for a Classification of Periodontal Diseases and Conditions (IWCP) in 1999. The patients in the diseased group had at least a loss of epithelial attachment of 3 mm, in more than one tooth, more than 3 points with probing depth of at least 5 mm and lesions in more than 2 teeth in each quadrant. The diagnosis of periodontitis was also confirmed radiologically.

The patients in the control group had no losses of epithelial attachment and no bone resorption, as confirmed radiologically.

Table 1. Demographical data and clinical parameters in patients with CP versus the control group

Demographical data and clinical parameters	**CP patients**	**Control group**	***p* value**
n	60	50	
Age (years) (min-max)	40.13±9.68 (23-58)	35.64±9.12 (23-57)	0.015
Women (%)	29 (48.33%)	32 (64%)	0.146
AT (number) (min-max)	8.85±5.50 (0-22)	1.10±1.71 (0-8)	<0.001
Mean PD med (mm)	4.44±0.79	2.42±0.28	<0.001
Max PD (mm)	7.48±2.03	2.80±0.30	<0.001
CAL (mm)	5.11±1.08	0	<0.001
PI (%)	30.77±33.41	21.36±19.64	0.358
BOP (%)	63.17±23.33	16.92±17.76	<0.001

The patients with CP were distributed in two groups, according to the severity of the disease, in order to observe a difference from the point of view of periopathogens when correlated with the severity of the disease (moderate, severe) expressed as loss of CAL. Thus, the group with moderate CP was included 28 patients with CAL loss < 5mm, and the one with severe CP of 32 patients with CAL loss ≥ 5 mm.

Table 2. Clinical parameters in patients with moderate versus severe CP

Characteristics	**Moderate periodontitis**	**Severe periodontitis**	**P value**
n	28	32	
Age (years) (min-max)	38.68±9.09 (25-55)	41.41±10.15 (23-58)	0.247
Women (%)	14 (50%)	15 (46.87%)	1
AT (number) (min-max)	6.43±4.24 (0-15)	10.97±5.66 (3-22)	0.002
Mean PD (mm)	3.89±0.47	4.93±0.70	<0.001
Max PD (mm)	6.71±1.82	8.16±1.99	0.004
CAL (mm)	4.26±0.48	5.87±0.89	<0.001
PI (%)	24.71±29.23	36.06±36.30	0.306
BOP (%)	56.57±23.85	68.94±21.60	0.037

The microbiological samples from the gingival sulcus to detect the periopathogens *Aggregatibacter actinomycetemcomitans, Porphyromonas gingivalis, Tanerella forsythensis, Treponema denticola, Prevotella intermedia* were taken with sterile paper cones by inserting them for 10 seconds in the gingival sulcus. A sample was taken from each patient from the control group, from 6 sites with PD > 4 mm. The samples were collected from the controls in 6 random sites. The paper cones were introduced in sterile recipients and transported to the laboratory of the Biochemistry Department of the University of Medicine and Pharmacy in Timisoara, in order to identify the periodontal pathogen markers through the polymerization chain reaction (PCR).

Extraction of nucleic acids was performed from the collected plaque samples, using the Qiagen kit (QIAamp DNA Mini Kit, QIAGEN GmbH, Hilden, Germany**)**. The samples were amplified for micro-Ident. Hybridization and the reaction with alkaline phosphatase were performed on a paper band. Data were introduced in the table provided by the micro-IDent kit, (Hain Lifesciences, Nehren, Germany) and were interpreted according to the indications of the producer. The results of the detectability levels of the microbial species *Aa, Pg, Pi, Tf* and *Td* were interpreted as scores (Table 3).

Table 3. Detectability scores for the microbial species *Aa, Pg, Pi, Tf* and *Td* and their interpretation

Detection level	Interpretation	Symbol
0	undetectable	-
1	10^4 (10^3 for *Aa*);	(+)
2	10^4-10^5 (10^3-10^4 for *Aa*);	+
3	10^5-10^6 (10^4-10^5 for *Aa*);	++
4	10^7 (> 10^6 for *Aa*).	+++

STATISTICAL ANALYSIS

The patient was considered the unit of analysis in this study. Inter-group comparisons in the were performed using the Mann – Whitney test (for two groups) and Kruskal – Wallis test (for more than two groups), respectively. Contingency tables for categorical variables were analysed using the chi square test or the Fisher's exact test, where appropriate. A *p*-value < 0.05 was regarded as statistically significant. When multi-group comparisons showed the existence of significant differences between the analysed groups, they were followed by pairwise post-hoc tests using the Bonferroni corrections. Odds ratios describing associations between microbial species were computed using logistic regression models.

RESULTS

The results of the analysis are displayed in Table 4.

Table 4. Frequency of detection for the five periopathogens in the analysed groups and p-values of Fisher tests for equality of proportions

Periopathogen	MCP	SP	Controls	p-values			
				overall	MCP vs SCP	MCP vs Controls	SCP vs Controls
Aa	4 (14.29%)	8 (25%)	4 (8%)	0.093	-	-	-
Pg	25 (89.28%)	29 (90.63%)	15 (30%)	<0.001	1	<0.001	<0.001
Pi	22 (78.57%)	26 (81.25%)	24 (48%)	0.002	1	0.009	0.003
Tf	27 (96.43%)	32 (100%)	26 (52%)	<0.001	0.467	<0.001	<0.001
Td	25 (89.29%)	30 (93.75%)	23 (46%)	<0.001	0.657	<0.001	<0.001

MCP - moderate chronic periodontitis
SCP - severe chronic periodontitis

For the periopathogens *Pg, Pi, Tf* and *Td*, the proportion of individuals for whom the investigated microbial species were present was significantly higher for periodontitis patients than for controls, but does not differ between MCP and SCP groups. In comparison, for *Aa*, the detection frequency is slightly lower in the control group than in the patient groups, however this difference is not statistically significant.

A more in-depth analysis considering quantitative determinations of microbial presence as detection scores (as given in Table 3) conveyed similar findings, that is, no significant differences among detection scores in the three groups in the case of *Aa*, and significantly more increased scores in the patient groups than in the control group, but no differences between MP and SP patients in the case of *Pg, Pi, Tf* and *Td* (see Table 5).

Table 5. Results (p-values) of tests for comparison of detection scores of the five periopathogens in the analysed groups

Periopathogen	**p-value**			
	overall	**MCP vs SCP**	**MCP vs Controls**	**SCP vs Controls**
Aa	0.142	-	-	-
Pg	<0.001	0.629	<0.001	<0.001
Pi	0.007	0.897	0.01	0.008
Tf	<0.001	0.552	<0.001	<0.001
Td	<0.001	0.787	<0.001	<0.001

MCP - moderate chronic periodontitis
SCP - severe chronic periodontitis

The number of microbial species identified per individual ranged from 0 to 5 for patients with MP (median: 4), from 1 to 5 for patients with SP (median: 4) and from 0 to 5 in the control group (median: 2). The Kruskal–Wallis test showed significant differences between groups in this respect ($p<0.001$); the post-hoc Mann–Whitney tests revealed that this difference was due to differences between pacients with MCP and controls ($p<0.001$), patients with SCP and controls ($p<0.001$), but not between patients with MCP and SCP ($p=0.266$). Thus, patients with periodontal disease, irrespective of its severity, generally had a greater number of microbial species than controls. Due to these findings, in subsequent investigations, the MCP and SCP groups were analysed as one single group (patients group).

Table 6. The Spearman correlation coefficients of the detection scores of the periopathogens

	Aa	***Pg***	***Pi***	***Tf***	***Td***
Aa	-				
Pg	0.23	-			
Pi	0.34	0.42	-		
Tf	0.28	0.75	0.51	-	
Td	0.33	0.69	0.55	0.81	-

The detection scores of the five microbial species were all pairwise positively correlated, and all these correlations were statistically significant, the strongest correlation was found between *Pg, Tf* and *Td*.

The odds ratio analysis (Table 7) showed significant positive association for all bacterial combinations investigated, except for the association between *Aa* and *Tf, Pg* respectively. The highest odds ratio between two species was found between *Pg* and *Tf*, meaning that individuals hosting one of these species are 42.8 times more likely than those not hosting them to harbor the other species, as well.

Table 7. Odds ratios of association tests between species (95% confidence interval)

	Aa	***Pg***	***Pi***	***Tf***	***Td***
Aa	-				
Pg	4.96 (1.29 – 32.76)	-			
Pi	9.74 (1.85 – 179.76)	5.55 (2.40 – 13.38)	-		
Tf	5.14 (0.96 – 95.43)	42.80 (11.27 – 283.03)	8.36 (3.17 – 24.26)	-	
Td	7.38 (1.40 – 136.49)	10.76 (4.27 – 29.78)	10.73 (4.27 – 29.20)	35.32 (11.16 – 140.01)	-

DISCUSSIONS

In our study, the prevalence of the periopathogens of the "red" group (*Pg, Tf, Td*) was over 90% in patients with CP. *Tf* was found in all patients with severe chronic periodontitis, and also in over 96% of cases with moderate chronic periodontitis. Similar results were found by Ertugrul et al. in 2013 (5), over 88% of patients with *lichen planus* harbored the *Tf* within the gingival sulcus. Similar results were also found by Tomita et al. (2014) in a Japanese population. *Tf* was found in 85% of patients with CP, as well as a positive correlation with probing depths (6). The high prevalence of *Fn* was also noted by Herrera et al. in a study of CP in patients from Colombia and Spain (36% and 39%, respectively), and lower in CP patients in Chile.(7)

The prevalence of the other two periopathogens in the "red" group was highly similar. In the group with moderate chronic periodontitis, *Pg* and *Td* were present in 89% of the cases, and in the group with severe chronic periodontitis 90% (*Pg*) and 94% (*Td*). Slightly lower values were noted by Gatto et al. (78% for *Td* and 82% for *Pg*) in Italian patients (8). Ali et al. describe a prevalence of 76% in a group of Romanian patients in 1996 (4), the same author reminding about a lower prevalence of *Pg* in patients from Sudan and Norway (9),

In this study we found a prevalence close of 80% of *Pi* in patients with CP, and 48% in healthy patients. *Pi* was detected with a high frequency also in North-Korean patients, according to Choi et al.. The frequency of *Pi* in the gingival sulcus of patients with CP is also high in China, as reported by the same author (10).

In our study, the least prevalent periopathogen was *Aa*, encountered in 14% of patients with moderate chronic periodontitis, in 25% of patients with severe chronic periodontitis and in 8% of patients of the control group. These results are in accordance with Gatto et al. (2014) (8) on a sample of Italian population, in which a frequency of 18.5% was found in patients with CP, as well as with that on the population in Chile, where *Aa* was present in 10% of patients with CP, and with the prevalence found in the USA 14.7% (11). The low prevalence of *Aa* in patients with CP could suggest the decrease of importance of this periopathogen in the etiology of this disease in Romanian periodontal patients, 20 years after Ali's study in 1996, which found a prevalence of *Aa* of 41% in Romanian patients with CP (4), possibly because of the increases in the quality of the periodontal care. Correlations were found between the prevalence of *Aa* and the probing depth, similar with the one noted by Tomita et al. (12).

CONCLUSIONS

1. All species of periopathogens investigated were detected more frequently in patients with CP than in the control group.
2. The quantitative values of periopathogens were higher in patients with CP, when compared with the patients without this condition.

3. There were no significant differences of the quantitative values of periopathogens in the group of patients with moderate chronic periodontitis, when compared patients with severe chronic periodontitis.
4. A significant correlation of periopathogens was found between *Tf, Td* and *Pg,* belonging to the "red" complex. Thus, the presence of *Tf* in the gingival sulcus raises the chances of detection of *Pg* more than 40 times, in comparison with healthy individuals. Also, it seemed that the presence of *Td* increases the risk for infection with *Tf* over 35 times.
5. In the group of patients with CP, three periopathogens were present in significant amounts in patients with higher PDs, the detectability score increasing proportionally with the value of PD. *Aa* was found in correlation with the maximal value of PD, and *Tf* and *Pg* in correlation with this average value.
6. In the control group, the presence of *Pg* and *Tf* was correlated with high levels of the plaque and bleeding indexes.
7. Quantitative determination of periopathogens using the PCR technique is useful for the prescription of antibiotic regimens for chronic periodontitis, resulting in an efficient treatment.

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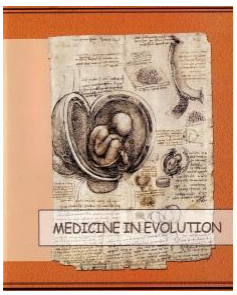
The microleakage at the implant-abutment interface. A literature review



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Abstract

The microleakage phenomenon is a major problem in many restorative procedures in dentistry. Whether we talk about the sealing of the endodontic filling or the integrity of the composite restoration, the microleakage that may affect the interfaces is one of the key factors that influence the long term success of the therapy.

Regarding the implant-based dental therapy, a literature review was completed, trying to determine the factors which can reduce the risk of microleakage and, thus, increase the rate of success.

Most of the studies in the international literature focused on analysing the integrity of the implant-abutment connection by immersing the implants in different solutions and checking for modifications inside the implant chamber, while other authors used mechanical fatigue and HQ cameras to record the micromovements of the abutment. Though there were different results, depending on the type of implant and implant-abutment connexion, none of them are completely immune to the phenomenon.

Keywords: microleakage, peri-implantitis, implant-abutment interface

INTRODUCTION

Implant therapy has seen a massive spread throughout the last 20 years all over the world. If in the 60's and the 70's only few dentists knew about the revolutionary therapy, starting with the 80's and 90's, the industry was starting to grow and became more accessible worldwide and by the 2000's being one of the most popular methods for treating single or multiple edentation cases. [1] [2] But as with any new medical concept, the experience comes in time, also through failures. After years of experience with dental implants, a new disease emerged: periimplantitis. This new term was meant to cover all the infectious affections causing an inflammatory process in soft tissues and bone loss around an osseointegrated implant. [3] [4] [5] There have been many debates in the scientific world on what exactly causes this local inflammation around the implants, but the general consensus is that the main factor is represented by the oral bacteria located around the implant.6 Initially the surface of the implants was blamed, which may be uncovered by bone in time.

More recent studies, though, pointed out the existence of microleakage and the vacuum effect at the implant-abutment interface. This phenomenon appears during mastication and is caused by the micro-movements of the abutment, which allows the passage of oral bacteria inside the implant and hence producing the inflammation of the surrounding tissues, as seen in fig. 1. [7] [8] [9] [10]

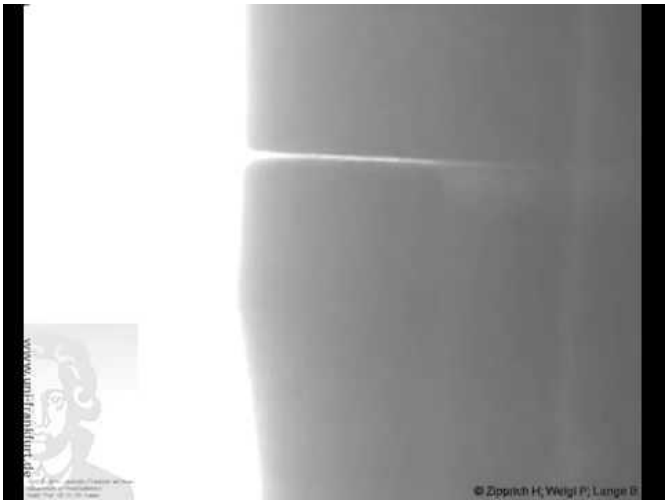

Figure 1. The micromovement of the abutment (Copyrught from Dipl.-Ing. Holger Zipprich Poliklinik für zahnärztliche Prothetik, Sektion Werkstoffkunde Theodor-Stern-Kai 7 / Haus 29, D-60590 Frankfurt am Main)

If the rest of the incriminated factors for peri-implantitis, like the surgical protocol or the prosthetic treatment, are more or less under the control of the dentist, the microleakage is much harder – if not impossible – to detect and to stop or to prevent. When it comes to the sealing capacity of the impant-abutment interface dentists are completely at the hand of the manufacturers. The purpose of the present literature review is to determine the main clinical and technological factors which influence to the success of implant-based treatments in the future.

MATERIALS AND METHODS

To compile this literature review a search of several scientific dental online magazines was performed. The key words used in the search were peri-implantitis, microleakage and periimplant lesions. The research focused on publications that contained data regarding the complications related to the microleakage phenomenon present at the implant-abutment interface.

The cited articles used multiple mechanisms to determine the in vitro sealing capacity of the implant-abutment interface. The authors used multiple implant-abutment systems – internal hex, external hex and morse taper. The main methods for studying the implant-abutment interface were:

The immersion technique

In this technique, the authors have inoculated the inner part of the implant with a bacterial suspension before tightening the abutment according to the manufacturer's recommendations – fig.2. Afterwards, the implant-abutment complexes were immersed in sterile solution and left there for a number of days, between 7 and 14 at 35-37^{0}C. After this period the solution was examined to see if there was any bacterial contamination from inside of the implant. Other authors did similar experiments, but the bacterial suspension was on the exterior and the sterile solution inside the implant.

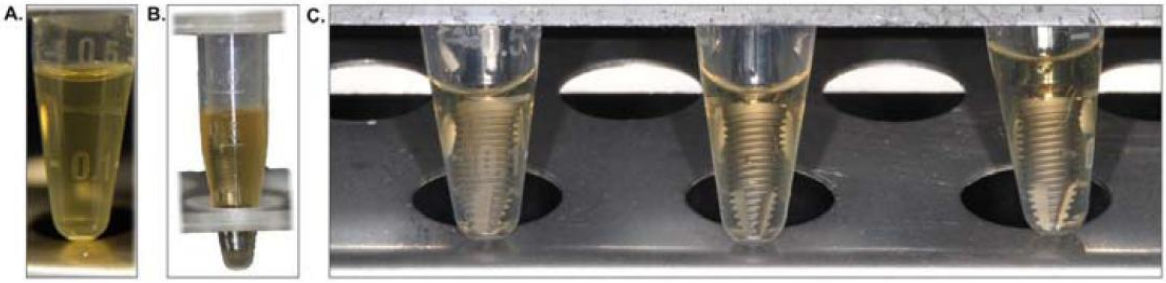

Figure 2. Implants immersed in the sterile solution (João Paulo da Silva-Neto: Brazilian Journal of Oral Sciences - Bacterial microleakage at the implant-abutment interface in Morse taper implants)

Mechanical fatigue

During this technique controlled forces of 120-200 N were automatically applied on the abutment. After a number of predetermined cycles, the interfaces were examined and the tightening torque of the abutments was measured to see if the connections suffered any modifications – fig. 3. Other authors applied forces while the implant-abutment complexes were immersed in a sterile solution – similar to the first technique – and checked for the occurence of the microleakage during loading forces.

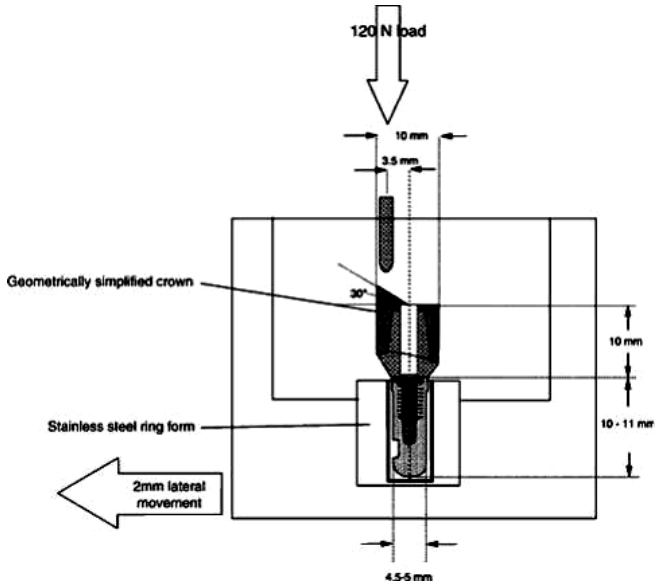

Figure 3. Forces loaded on the abutment (Besimo CE, Guindy JS, Lewetag D, Meyer J. Prevention of bacterial leakage into and from prefabricated screw-retained crowns on implants in vitro.)

Real time high speed camera

The authors used abutments which were loaded at an angle of 30° with a force of up to 200 N, while a constant and diverging X-ray device radiated the inspection pieces. With a special device the xray was transformed into visible light and x-ray videos were recorded, using a high speed digital camera, as presented in fig. 4. It was basically a live close-up inspection of the implant-abutment interface during loading forces.

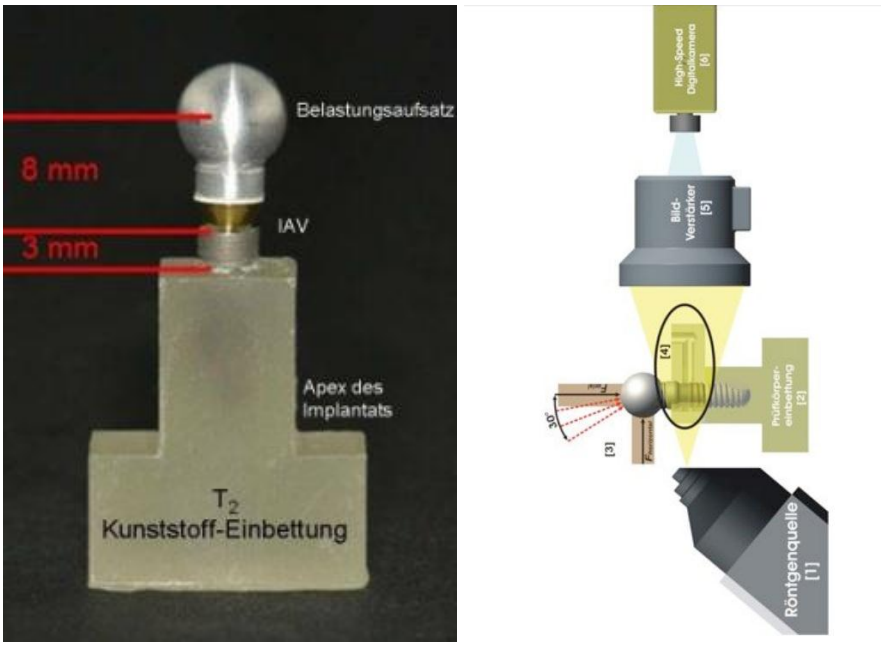

Figure 4. Real-time abutment micromovement recording (Dipl.-Ing. H. Zipprich: Implantologie - Micro-Movements of Implant-Abutment Interface)

RESULTS

Immersion technique – All types of connections were affected by microleakage, including morse taper ones, which are thought to have better characteristics. At the biochemical examination of the sterile solutions, bacterial contamination was detected at all implant systems, regardless of the brand or the type of connection between the implant and the abutment. If in the first few days the morse tapper systems seemed to have better results, after a 14 days period there were no significant difference between the groups[7, 9, 11]

Mechanical fatigue – When it comes to interface's stability and durability under loading forces, the situation is different. Morse taper implants had far better results, the tightening torque of the abutment being only slightly loosen.[12] On the other hand, for the internal and external hex systems, the torque was significantly more loosen, especially for the former. To compare the three systems, the quality of the interface is as it follows: Morse Taper > Internal hex > External hex. Regarding stress distribution to the implant and in the peri-implant bone tissues, Morse Taper implants had as well the best results.[15]

Real time high speed camera - All implant-abutment connections with a clearance fit exhibit a micro-motion (implant systems: SIC®; Camlog®; XIVE®; Straumann synOkta®; Bego-Semados®; Straumann massive conical abutment®) observable during loading. The only implant systems with no visible abutment movement were precision conical connections (implant systems: Ankylos®; Astra Tech®)[19]

DISCUSSIONS

Due to the virtual space existing between the implant and the abutment and the movements of the abutment-crown complex during masticatory forces, a vacuum effect will

cause the oral liquids from the proximity of the implant to be drawn inside the implant chamber. This phenomenon represents one of the main causes of periimplantitis and implant failures.

Periimplantitis and its side effects is still one of the biggets challanges for the practitioners worldwide. Even though the surgical protocols developed gradually in precision and the implant-based prosthetics got more complex, the microleakage phenomenon between the implant and abutment seems inevitable.

In addition to that, in vitro studies contain conclusive results on how the microleakage affects all types of implants and connections. On the contrary, in vivo situations look slightly different, since not all patients develop periimplantitis. This implies that more factors contribute to the long-term success or failure of the implant treatment. One important aspect may be the patient's immune response. Even if the local conditions are the same (present microleakage in all types of implants at a certain degree), the general condition of the patient and his immune system represents a decisive factor.

Another important factor that influences the integrity of the implant-abutment sealing is the repeated screw tightening of the abutment. Even though all the implant systems are faced with the microleakage problem, aditional laboratory and/or clinically steps can interfere. It has been proven that repeatedly screwing and unscrewing the abutment will cause a more accelerated colonisation of the bacteria inside the implant. [18]

Not only does the microleakage takes place from the oral cavity to the inside of the implant, but, as proven by a number of studies, there's an ongoing exchange of fluids from and to the implant chamber. This clinically translates to the fact that the implant chamber itself can become a bacterial reservoir which can initiate and maintain a chronical inflamation of the tissues around the implant.

The fact that the inner part of the implant and the communication with the oral cavity cannot be by any means controled, make the microleakage phenomenon one of the most challenging problems in modern dentistry.

The findings only emphasize more the importance of respecting the biology of the patient and that the oral factors can turn the implant based therapy into a failure, even if all prosthetic and technical protocols are respected.

CONCLUSIONS

No type of implant design, shape, or implant-abutment connection can prevent completely the microleakage phenomenon. The implant-abutment interface will always have a certain degree of mobility under loading forces which, in oral conditions, can lead to the vacuum effect and, thus, the bacterial colonization of the implant.

The process that follows the microleakage phenomenon in the oral environment is the bacterial colonisation of the implant. And the main problem related to this is the impossibility of the patient to access and clean properly the area. Under these conditions a chronical inflamation site is likely to appear, which on long term can lead to the disease called peri-implantitis.

The fact that there's a two way communication from and towards the inside of the implant chamber proves that the vacuum effect caused by the micro-movements of the abutment, will be followed by a fluid release around the implant, colonised with bacteria. With the specific area being literally impossible to access and clean properly by the patient, the bacteria colony from inside the implant will act like a continuous source of inflamation for the surrounding tissues. From this point on, the patient's imune response is of a major importance. Of course, the correct prosthetic restoration and the overall oral hygine of the patient are decisive for the long term success of the treatment.

The correct surgical and prosthetic protocols, together with the patient's immune system and biologic status, are all to be taken into consideration when choosing the implant based therapy and they all contribute to the long term success of failure.

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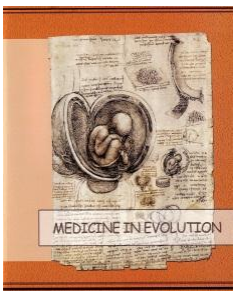
Evaluation of the Efficency of Dental Profilaxy Methods Applied to School Children from a Rural Disadvantaged Area



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Abstract

This study aims the implementation of the concept of dental prophylaxis among children in primary and secondary education through programs tailored to the specifics of the area studied.In this respect the authors evaluated a batch of school children from a rural area from Romania, namely Rosia Montana with the purpose of assessing the oro-dental status. As part of the evaluation of the dental status, the determination of the decay rate by calculating the DMFT index and the determination of dental hygiene, by calculating the OHIS index, had been completed. Concurrent to these activities, the authors performed an extensive preventive program addressed to subjects and also applied one set of questioners to evaluate the significance of the prevention program and the eventual correction in terms of various aspects influencing the dental health.

Keywords: DMFT, OHIS, decay, prophylaxis lesson, rural.

INTRODUCTION

Like other aspects of children's health, oral health must be considered in the context of social, cultural, and environmental factors.[1] Developing health promotion interventions for children is necessary to think at: making mistakes and learning from them is certainly far better than doing nothing at all. With the continuing change in communications tools, health organizations must embrace these technologies or risk being left behind. [2; 3]

Education in schools prepares girls and boys to accept responsibility for their own health and to engage in personal care that will maintain and improve health. The use of precious classroom time to teach personal self-care skills, and using the school setting to screen and refer children for needed dental services can be justified by the impact on children's health and welfare.[1; 4]

Progress has been made in developing programs to prevent dental disease, but the prevalence of the disease remains high and the co-morbidities are increasing. Decay in children teeth has increased in all populations but greater in minority, less educated and poor.[5; 6]

The study area has a specific demographic and socio-economic status, as it is a former mining area, isolated from the point of view of access to dental services, which currently faces an unemployment rate of over 50% and which incorporates a significant community of children belonging to the Roma minority.

This study has a double purpose such as:

1. implementation of the concept of dental prophylaxis concept among children in primary and secondary schools in this rural and disadvantaged area, through programs tailored to the specifics of the area;
2. evaluation of the efficiency of the applied programs.

MATERIAL AND METHODS

The study was completed during Jan-Dec 2016.The study batchconsisted of 132 children, aged 5-15 years in the village of Rosia Montana, Alba County.

For this study it was obtained the consent of the parent/legal guardian, for all the children participating in the study.

The examination of each child in the study was performed according to the recommendations of the World Health Organization[7];the examination was conducted by dentists specialized in pediatric dentistry and lessons on prevention have been carried out by students attending courses at the dental medicine faculty from Oradea, who were trained in advance. Results obtained from the consultations were recorded in a tailored consultation file, addapted to project requirements.

The project had two phases, such as:

Phase 1, consisting of:

1. Evaluation of oro-dental status, through:
    - Determination of the decay rate by calculating the DMFT index (Decay Missing Filing Index), which represents the intensity index reflecting the decay experience of the subject. In order to calculate the DMFT the tooth with one or several decays has been noted with letter D, the missing tooth as consequence of decay was noted with letter M and the tooth presenting one or more dental restauration or filling as result of dental decay was noted with letter F. There were not considered the absent tenth or restored teeth resulting from other causes than decay. Considering the fact that the maximum age of subjects included within the batch was 15 years old, the molar no. 3 was not present therefore the value of DMFT was ranging 0 to 28 by summoning up the indexes D+M+F.

- Determination of dental hygiene, by calculating the index OHIS (Oral Hygiene Index); authors selected 6 appropriate surfaces of 6 teeth, out of which 2 were selected from frontal group and 4 from the back. From the frontal group there were selected teeth numbered 1.1 and 3.1; should the mentioned teeth missed from the frontal group, the homologous tooth situated on opposite side of median line had been selected. Considering the posterior group, the 6 year molars were selected, namely teeth numbered 1.6, 2.6, 3.6 and 4.6; should any of these teeth missed, the next erupted tooth had been considered, namely 1.7, and in case of subjects aged under 12 who did not have the 1.7 tooth erupted, it was considered the last premolar existing on the dental arch. In the case of selected teeth from the frontal group the vestibular surfaces were assessed; in case of teeth from the posterior group, the vestibular surfaces of teeth were assessed for the superior ones and the lingual surfaces of teeth were assessed, for the lower ones. Using the oral probe, all the areas were checked in order to discover the presence of soft deposits, resulting into DI-S index (Debrids) as well as the presence of tartar, resulting into CI-S index (Calculus). The values of DI-S şi CI-S may vary between 0 to 3 and the summon up of these two indexes resulting into the values of OHI-S index; the OHI-S value may range between 0 to 6.[8]

2. Implementation of an adapted programme of prevention depending on the results that were obtained

The children attending the study were gropued into age groups, respectively 5-8 years old group, 8-10 years old grup and 11-15 years old group. The dental prophylaxis lessons were addapted to the age category; both graphic and audio-visual methods were used.

Also, it has been carrying out demonstrative techniques of correct dental brushing using a macroeconomic dental modell; the demonstrations were carried out initially by the students, after which each child was invited to exemplify the correct brushing techniqu

Discussions with children were conductedin order to obtain feedback regarding the understanding and assimilation of those presented during the prophylaxis lessons on prevention.

Phase II, consisting of a determination of the effectiveness of prevention methods used, 3 and 9 months following their application

1. The application of individual questionnaires, approximately 3 months following the prophylaxis lessons in order to assess the level of learning of theoretical and practical knowledge, revealed by the prevention program developed.
2. Re-evaluation of the oral hygiene status of children from the study batch, based on new investigation conducted 9 months following the implementing of the study; the values of OHIS were re-calculated, using similar methodology.

RESULTS AND DISCUSSION

Results of implementing Phase I

1. Determination of the decay rate by calculating the DMFT index (Decay Missing Filing Index)

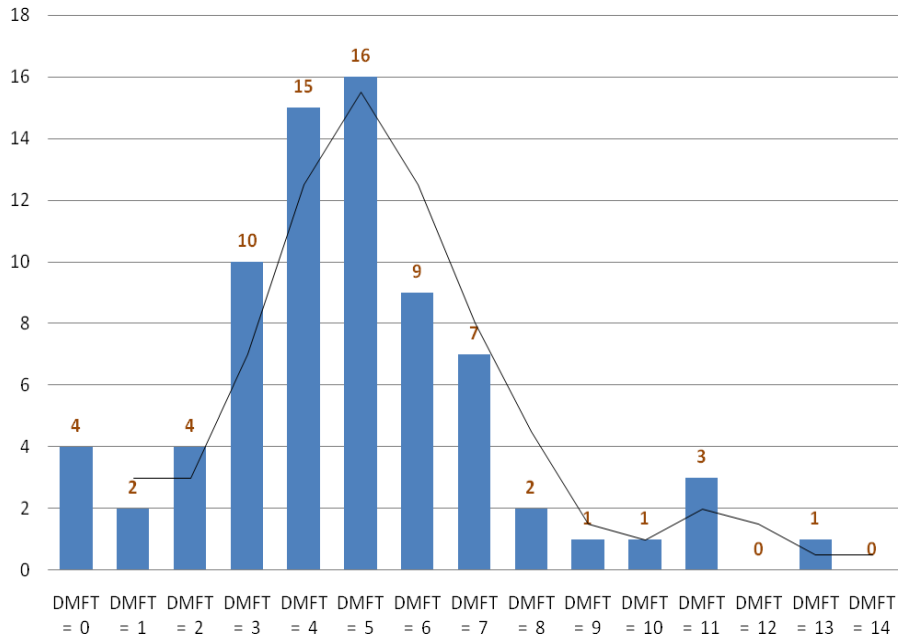


Figure 1. Distribution of DMFT index (number of appearances)

By measuring and modelling the vales and distribution of DMFT index resulted into the following aspects:

- over 75% of the measured and calculated values range DMFT 3 to 7;
- out of the values composing DMFT index, respectively "Decay, Missing, Filling", the "Decay" variable stands for over 90% of the DMFT index;
- compared to "Decay" variable, the "Filling" variable has a very low value, standing for under 5% of the DMFT index;
- thisfacts denote that the addressability of the children to dental services is very low.

2. Determination of dental hygiene, by calculating the index OHIS (Oral Hygiene Index)

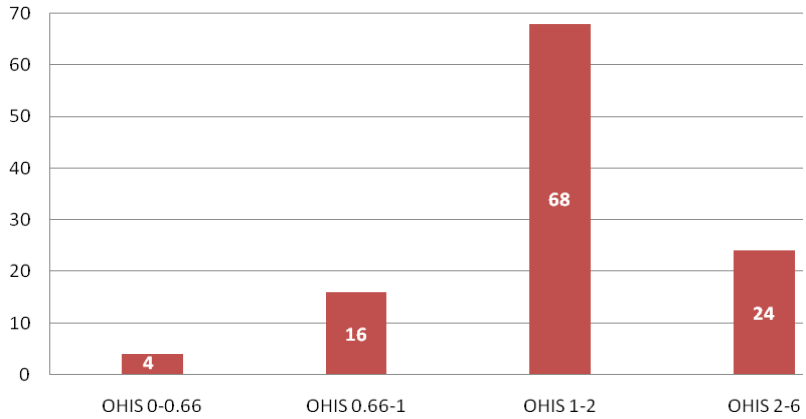


Figure 2. Distribution of OHIX index within the study batch (number of appearances)

Through measuring the OHIS index, the following values were obtained:

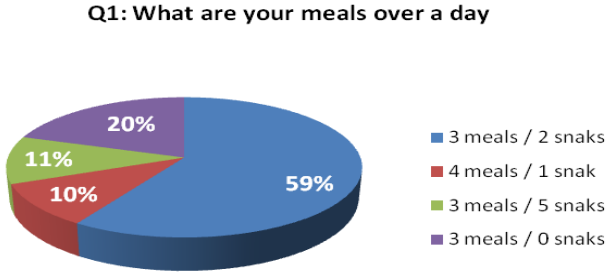
OHIS index – gap values	**Interpretation of value**	**Percentage value within the studiy batch**
OHIS 0-0.66	Very good	4%
OHIS 0.66-1	Good	14%
OHIS 1-2	Satisfying	61%
OHIS 2-6	Deficient	21%

Considering the measured values for OHIS index, the following aspects are relevant to this matter:

- subjects presenting a good and very good oral hygiene are in minority, standing for 18% of the batch;
- most of the children were presenting a satisfying (sometimes rather deficient) oral hygiene (61% of the subjects);
- there is a significant subjects (21%) presenting a deficient oral hygiene;
- overall dental hygiene, measured on the basis of data collected from the study sheet, denote the following:
    - an inappropriate / unhealthy eating habits, possible due to material difficulties faced by parents and taxpayers, but also a poor oral health education;
    - deficient oral hygiene;
    - poor addressability to dental services.

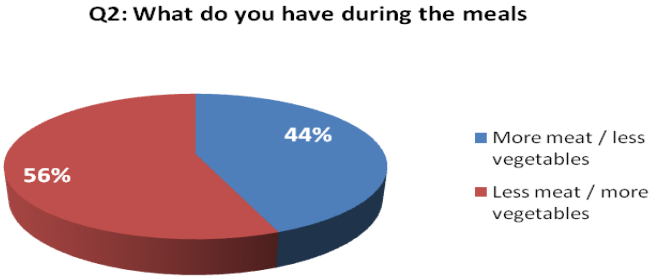
Results of implementing Phase II

As mentioned within the Material and Method, there were two sets of individual questionaieres completed with the subjects, approximately 3 and 9 months following the prophylaxis lessons. Bellow one may find the results and interrpreation of part of the first set of questionaires.



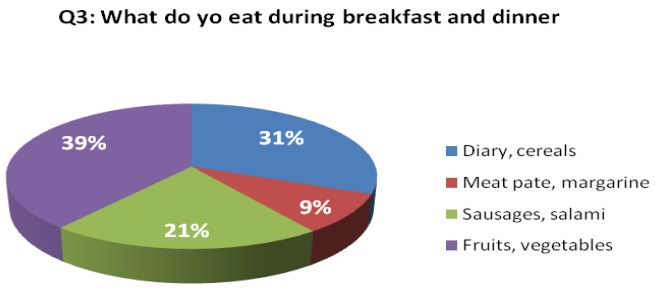
Q1 explanation:

As recorded in the questionnaires, more than 50% of the children participatingwithin the study declared ideal meal habits.This is contradictory to the findings of the examination of the oro-dental status.



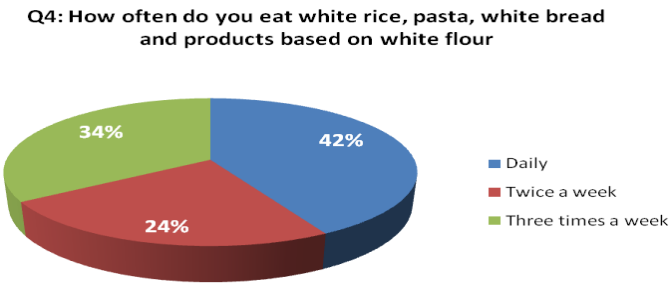
Q2 explanation:

As recorded in the questionnaires, more than 50% of the children participatingwithin the study declared ideal content of the meals.This is contradictory to the findings of the examination of the oro-dental status.



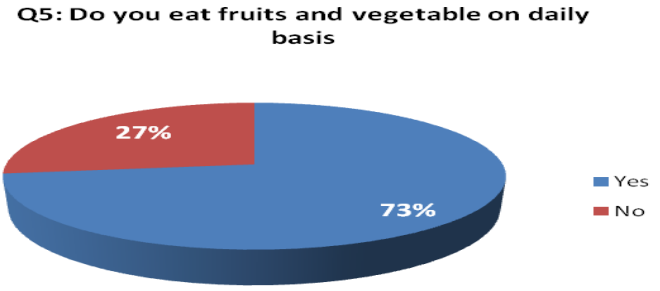
Q3 explanation:

As reported in the questionnaire, almost 50% of children consume the fruits and vegetables, and almost 70% have an ideal eating for breakfast. This is contradictory to the findings of the examination of the oro-dental status.



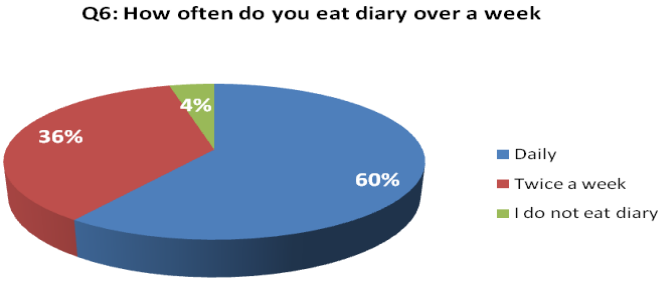
Q4 explanation:

As recorded in the survey, more than half of the children taken into study rarely consume carbohydrates. This is contradictory to the findings of the examination of the oro-dental status.



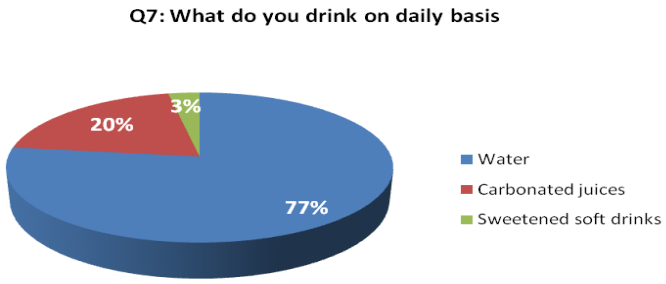
Q5 explanation:

As reported in the questionnaire, almost all children learn consume fruits and vegetables daily. This is contradictory to the findings of the examination of the oro-dental status.



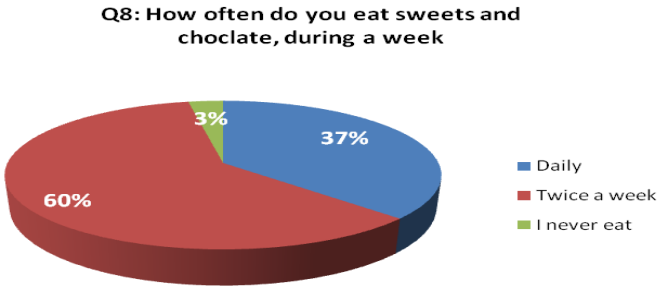
Q6 explanation:

As reported in the questionnaire, more than 90% of children consume milk, out of which 60% do that on daily basis.



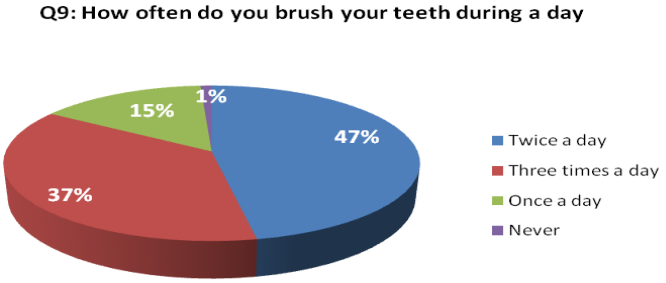
Q7 explanation:

As reported in the questionnaire, only 23% consume sodas and sweetened drinks. This is contradictory to the findings of the examination of the oro-dental status.



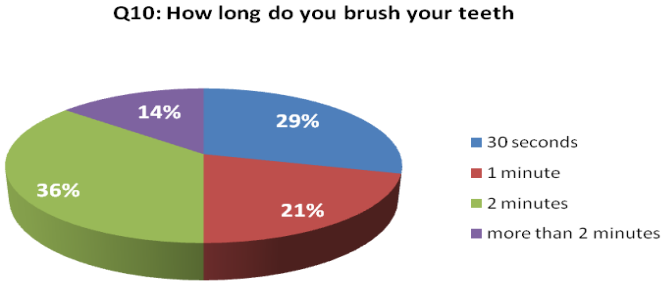
Q8 explanation:

As recorded in the survey, only 37 percent consume sweets daily. This is contradictory to the findings of the examination of the oro-dental status.



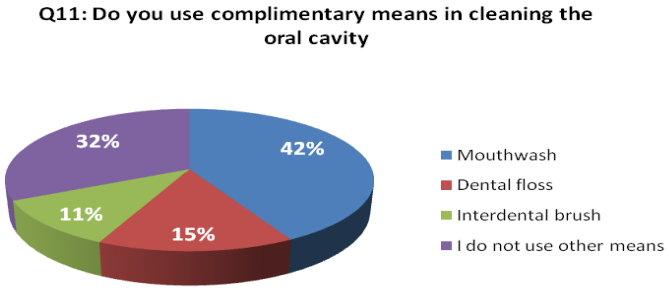
Q9 explanation:

As recorded in the survey, 84% of children wash their teeth at least 2 times a day. This is contradictory to the findings of the examination of the oro-dental status.



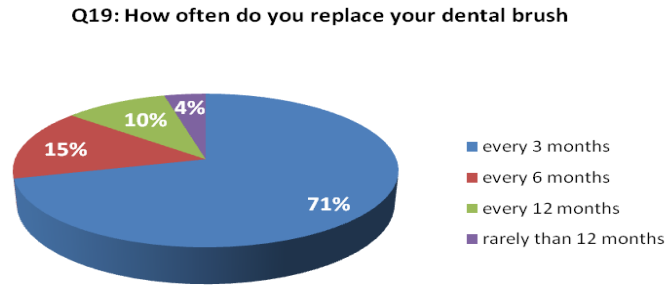
Q10 explanation:

As reported in the questionnaire, almost 50% of the children assign a time ideal dental brush.This is contradictory to the findings of the examination of the oro-dental status.



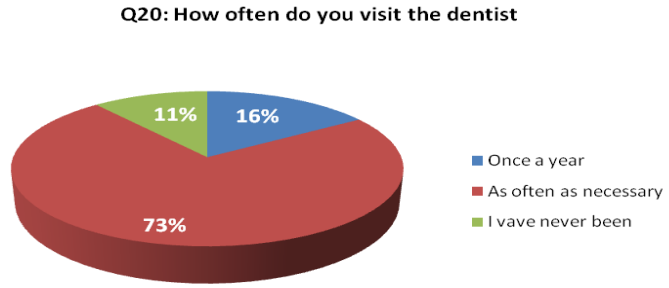
Q11 explanation:

As reported in the questionnaire, 68% use auxiliary means for oral hygiene. This is contradictory to the findings of the examination of the oro-dental status.



Q19 explanation:

As reported in the questionnaire, almost all children change your toothbrush Wallace with an interval of time. This is contradictory to the findings of the examination of the oro-dental status.



Q20 explanation:

As reported in the questionnaire, almost all children taken into study go to the dentist as often as needed. This is contradictory to the findings of the examination of the oro-dental status.

Re-evaluation of the dental hygiene by calculating the index OHIS (9 months following the prophylaxis lessons) resulting into the following values:

OHIS index – gap values	Interpretation of value	Number of appearances	Percentage value within the studiy batch
OHIS 0-0.66	Very good	3	4%
OHIS 0.66-1	Good	12	16%
OHIS 1-2	Satisfying	49	65%
OHIS 2-6	Deficient	11	15%

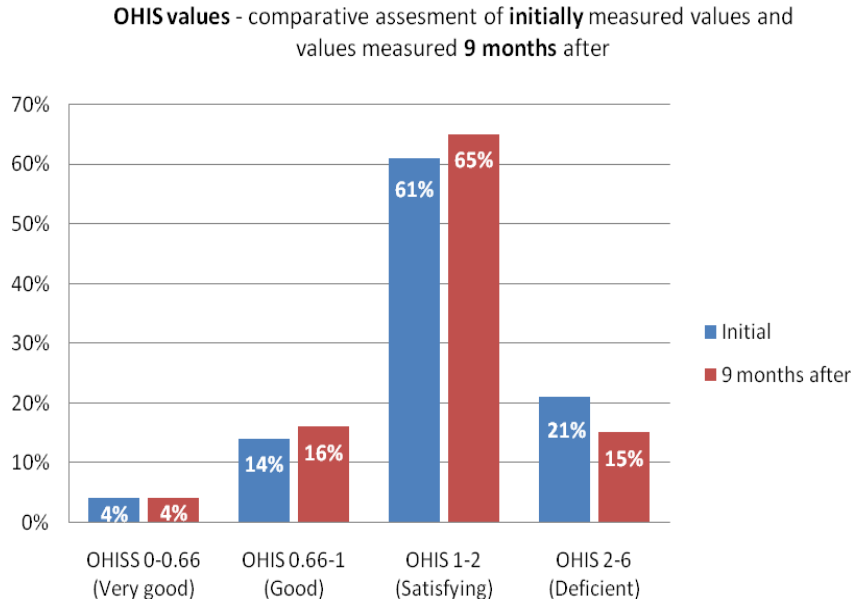


Figure 3. Distribution of OHIS index within the study batch – a comparative look at the beginning and the end of the project

Children with a good and very good dental hygiene are in small percentage, only 20% of the batch; however it is worth mentioning an increase of 2% of the initial value of the subjects of the category "good dental hygiene and very good" at the end of the second stage.

Most children, however, show a satisfactory towards poor dental hygiene status (65%).

After implementing preventive measures, it resulted into a high proportion (15%) of children with a poor dental hygiene, however, dropping from the initial value of 21%.

Considering the above it is not enough only a theoretical approach in regards of the application of methods of dental prophylaxis in the studied area.[9] A multidisciplinary approach is needed involving doctors, pediatricians, teachers, parents and medical institutions in the area resulted into applied practical methods of preventive dentistry such as dental tray, dental sealants, which may determine the decrease in the incidence of dental decay. Also dental treatments must be done, which corroborate with issues of prevention, nutrition and dental hygiene determine a significant decrease in the values of DMFT index.[10; 11]

The doctor need to be a good psychologist and is necessary to perform a close proximity with all the patients. Emotional opening of the doctor on the patient ensure a good cooperation in oral health education and for the treatment.[12]

A competitive dental practice requires as a priority the management practice. This is not been comparable to a similar type of marketing techniques like: selling more, earning more money, or manipulate the patients. [13]

CONCLUSIONS

1. The results obtained from the application of the questionnaire, found that the subjects children, participants in this project have learned very well the theoretical knowledge required to ensure a proper dental hygiene;
2. Theoretical knowledge is reflected, hence very little, in actual reality, therefore the index measuring the decay intensity (Decay DMFT-Missing Filling) remaining very high;
3. After the evaluation oro-dental status through calculation of OHIS dental hygiene indexones could see an all-round improvement of the index values, improving the valueby approximately of 5% to the end of the project

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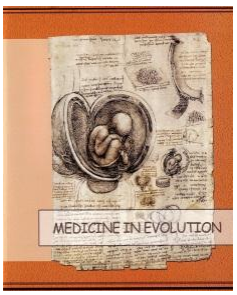
Diagnosis and evolutional clinical-radiological aspect of maxillary cysts



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Abstract

The evolution of cysts is usually the stimulation of epithelial tissue debris manifested by proliferation of epithelial cells, but without the invasion of surrounding tissues. As the volume of the epithelial mass increases, the central cells reposition themselves to the periphery, being as close as possible to the vascularization area. However, some cells are necrotic, they are destroyed by progressively forming the fluid content of the cyst. This is hyperton, attracts transsudation and creates hydrostatic pressure that leads to pressure resorption of the bone. In this way, the cyst grows in diameter. A vicious circle is formed by epithelial cell necrosis located in the cyst, transsudate, hypertonia, bone lysis, increased hydrostatic pressure, volumetric cyst growth, and therefore cell hypoxia, which causes progressive growth of the cystic formation. Frequently, jaw cysts have similar clinical features as slow, asymptomatic, expansive, deformation of bone cortex, with characteristic radiological appearance, representing a symptom for diagnosis. Finally, the positive diagnosis is based on the outcome of the histopathological examination.

Modern imaging methods have radically changed the approach and treatment of cranio-maxillo-facial spheres, especially those involving the assessment of bone pathology, but not only.

Keywords: Cyst, bone resorption, clinical aspect, radiological aspect, diagnosis

DIAGNOSIS OF MAXILLARY CYSTS

Numerous studies of the origin of the maxillary cysts were based on anamnesis data that provided information on the onset of the condition, whether there was a history of an increase in the inflammatory process, whether the patient accused the pain or eventual paresthesia in the affected area, if there was a bone deformity or even a fistula, whether mucous or cutaneous.

Jaw cysts, even if they have a different etiology, have similar symptoms. Differences are given by localization, by the sense of growth, as well as by the existence of possible complications [1,3,4].

Diagnosis of jaw cysts requires complementary examinations. In order to establish a correct diagnosis, it is necessary to test the vitality of the suspect teeth that have a close relationship with the cystic formation.

Thermal, cold or hot tests, electrical tests, or even exploration drilling can be performed if the above are not conclusive.

Another complementary diagnostic tool is exploratory puncture. This can only guide us, not providing clear data about the nature of the bone lesion. This analyzes the hard or liquid consistency of the maxillary cyst. When the examination reveals the presence of fluid, we can focus on a certain form of bone injury.

In some cases, for the purpose of diagnosis, radiopaque substances are introduced after the evacuation of the cyst content, an X-ray will be made to contrast the cyst relations with the adjacent anatomical elements, its limit, and the thickness of the cystic wall [8,9].

With the help of radiographs made in different incidents, other details of the cystic formations can also be obtained. In the case of cysts that come into contact with the maxillary sinus, after a puncture is performed on it, a contrast substance is introduced and radiographs are performed at different incidences. Thus, important elements can be obtained in order to establish the diagnosis of the formation that is in the immediate vicinity of the maxillary sinus.

Another important diagnostic tool is biopsy performed before surgery. This is indicated for cystic formations with atypical clinical or radiological aspects.

The radiological examination is of particular importance for establishing a correct diagnosis due to the fact that the clinical manifestations of maxillary cysts have common elements with different tumor formations present at the level of the maxillary bone [5,10].

Radiographic examinations can show cysts from the endoscopic stage even before clinically evident symptomatology. Also, the radiological examination is useful in highlighting the ratio that the cyst has either with its teeth or with other adjacent anatomical elements, such as the maxillary sinus, mandibular canal or nasal passages [11,12,13].

It is possible to establish appropriate treatment methods and surgical technique, giving indications of the possibility of maintaining the arches in the arch using apical resection or when extraction is indicated, indicating also the degree of bone resorption [2,5,9].

The following types of radiographs are indicated: orthopantomography (standard panoramic radiography), retroalveolar or occlusal radiography in the case of a small cyst or even in the case of a more voluminous cyst to highlight the relationship between the teeth and the cystic form. Also, SAF radiographs (anterior sinuses of the face) are useful. On these radiographs, the maxillary cyst appears as a round radiotransparent area delimited by a marginal bone condensation zone.

Computerized tomography (CT) can highlight the difference between a solid cystic form and mark any potential tumor changes that may occur in a cystic form.

CT is an effective method in evaluating the formations of the maxillary bones because, through a classic radiological examination, it is sometimes difficult to determine the exact extent of the bone lesion and the degree of involvement of the adjacent structures.

In these cases axial and biaxial sections are useful.

Another complementary way of diagnosis is nuclear magnetic resonance, which is necessary in establishing the differential diagnosis between a cystic form and a maxillary tumor.

Nuclear magnetic resonance provides data on the solid or fluid type of the lesion, as well as data on the thickness and possibly the regular or irregular configuration of bone lesion walls.

CLINICAL - EVOLUTIONAL ASPECT OF MAXILLARY CYSTS

The cysts of the jaw bone show a similar symptom at the onset for all histological forms, but as it progresses, it may vary depending on the location, size, and direction in which the complications evolve, so that they acquire a number of their own clinical features, corresponding to the histological form.

There are different histopathological forms of jaw cysts, but they differ quite a bit from the clinical symptom of each type.

Jaw cysts develop in two successive periods. A period in which endosomal development occurs almost imperceptibly, followed by a period of bone outwardness [5,7].

Complications may occur in any of these two periods of jaw cyst evolution.

The first period is long-lasting and without clinical symptomatology. This can be described in small cysts or when they are still endosus.

After examination of the dental arch, either the presence of a tooth with pulp necrosis or the absence of a permanent arcade tooth with the persistence of a temporary tooth, as well as dental movements, can be ascertained.

At the routine radiological examination, one can see the presence of a characteristic image of the cyst.

In the endosus period, the cyst is often found when either a tooth with pulp necrosis is desired or when after the opening of the pulp chamber, an amount of serum citrin-like liquid is removed by radiological examination or even dental extraction.

From a clinical point of view, the patient in most cases complains of a feeling of tension in the area or of symptoms similar to apical chronic periodontitis.

In the exoase phase, the cystic form can cause bone deformation of the area, either at the level of the vestibular, paralingual or palatine dwelling [8].

In some cases the deformation is obvious and exooral in the nazi-genian or mentonian regions. Soft parts appear in these cases pushed by the cystic formation, while the endooral covering mucous is intact, slightly relaxed and sometimes even congestive.

In the presence of a tough bone, with a considerable thickness, the bony plane appears smooth and painless. By exiting the cyst, the compact bone will bomb more and more. This is thinner, it gives the feeling of broken egg shell. Once it is completely spilled, fluctuation can be felt. Also during palpation a delineation of the fluctuation zone can be observed by a rough bone area [8].

With its extensive growth the cyst can affect the roots of the adjacent teeth.

In the first phase it develops around them, and then embraces them inside.

There are teeth with pulp necrosis at the level of cysts. They have in some cases marked mobility or even can be moved due to significant resorption [3,7].

RADIOGRAPHIC CONSIDERATIONS OF JAW CYSTS

From the radiological point of view, the jaw cyst is described as a round-oval radiotransparent area with well-defined limits. However, details of localization, shape, peripheral appearance, relationship with neighboring teeth, and disorders affecting the adjacent anatomical elements are very important.

These can help diagnose the diagnosis and give some information about the stage of swelling and the aggressive tendency of the cystic formation, thus contributing to the choice of the optimal therapeutic method [17,18].

The shape of the cyst depends on the anatomical structure because in most cases the maxillary cyst develops towards the direction of the minimum resistance.

The peripheral appearance of the maxillary cyst is often well delimited by a normal bone portion resulting from slow growth, thus resulting in normal bone apical phenomenon.

Thus, the radiotransparent area has an outlined contour formed by a thin radiopaque area of the same thickness over its entire extent around the bone lesion [19].

Cystic formation is well delimited by the surrounding healthy bone through a osteoconcentration line.

The inflammatory process clears the bone contour and thus gives the cyst image a less smooth edge. Sometimes it can be confused with a benign tumor or osteomyelitis if the limit from the normal bone is very erroneous [20].

Figure 1. Residual giant cyst

It is also possible to have a double contour or the existence of a non-homogeneous structure due to the uneven destruction of the two cortical ones with the perforation of one or both. One of the lines indicates the size of the vestibular destruction, while the other indicates the resorption from the oral part of the jaw bone.

Radiotransparency is the internal structure, and its appearance may often be different, decreasing from the center to the periphery [18,20].

A uniform radiotransparency is possible if the cystic form is in the middle of the jaw bone.

Non-uniform radiotransparency may occur in cysts that caused a higher bone resorption to the vestibular, causing some changes in the soft parts of the oral cavity.

Sometimes, cysts that have a vestibular development have no radiological features [21].

From the point of view of the radiographic dimensions of the jaw cyst, it is found that in most cases the cyst is larger than in reality, so that the radiological diameter does not always indicate the actual cyst diameter. It depends on the direction of the radiation beam centering, as well as the various bone overlaps [22].

CONCLUSIONS

Bone deformation, dental movements, and inflammation that may appear secondary to a superinfection are common to both cysts and maxillary tumors.

Radiological examination has an essential role in establishing the differential diagnosis between a cystic form and a maxillary tumor.

Radiological aspect of the maxillary cyst and benign tumors is that of osteolysis, a unilateral radiolucent area, well defined in a homogeneous manner, while in case of malignant tumors (sarcoma or carcinoma) there is a process of osteomyelitis, radiologically represented by an area of non-homogeneous radiotransparency, diffuse, without well-defined limits [3,7,9,14].

In the distal area of the jaws, malignant formations are often squamous cell carcinoma or mucoepidermoid carcinoma, radiologically represented by areas of radiotransparency with sclerotic or diffuse, irregular edges.

However, it is essential first of all to differentiate between the various lesion cyst types of the jaw cyst.

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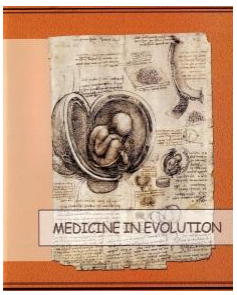
Personal studies and researches regarding the learning of teeth morphology of the students at Dental Medicine



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Abstract

In my daily work with students at Dental Medicine intervened a new element, namely: a group of students attending Dental Medicine as second form of higher education. This thing challenged me to a comparison between them and other students that are at the first faculty.

The specific hypothesis that was the basis of this research is the following: students attending the faculty of medicine and pharmacy, the dental medicine specialization as a second form of higher education, will have better school results in relation to those attending for the first time a faculty, aspect that is due to the formation of an effective intellectual work style.

We consider that the hypothesis from which we started in the present study was verified: students attending the Faculty of Medicine and Pharmacy, the Dental Medicine specialization as a second form of higher education, have achieved better school results compared to those who attend for the first time a faculty.

Keywords: *learn, student, teeth morphology*

INTRODUCTION

In our days the oral healthstatus of population is one of the great challenges in health, treatment and medical education, so in this context, the education, specialized training of staff and students have a very big importance.[1- 3] The most important educational information wich is transmited to the dental students is the evaluation of patients' teeth and oral cavity.[4-7]

In the dentistry education, students needs and have to practice many dental procedures.[8] The traditional approach in dentistry education based on the treatment of those patients who are referred to dental schools is based on practicing on the patients or on the plastic teeths.[9]

The dental and medical students are undergoing to a raised the stress level because of the curricula, the work with realpatients, the inconsistency of feedback on work between differentteachers, bad communication with teaching staff, and examinations and grades, so a lot f students lose the essention of the dental medicine: that is to know well the anatomic-morphology of the theets and the oral cavity.[10, 11]

In this study the specific hypothesis that was the basis of this research is the following: students attending the Faculty of Medicine and Pharmacy, the Dental Medicine specialization as a second form of higher education, will have better school results in relation to those attending for the first time a faculty, aspect that is due to the formation of an effective intellectual work style.

MATERIAL AND METHODS

We studied a group consisting of 70 students at Dental Medicine from Oradea, 56 girls and 14 boys.

We divided the year into two large groups of study, namely:

- the first group includes 50 students that are at the first faculty;
- the second group includes 20 students that are at their second faculty namely:
  - ❖ 15 are graduates of the College of Dental Technique;
  - ❖ 5 are graduates of the General Medicine Faculty.

During the academic year we run a series of current assessment tests ("continuous assessment") in the subject of dental Morphology. We compared the test grades obtained by the students from the 2 groups.

RESULTS

The students were divided in two groups (Fig. No. 1)

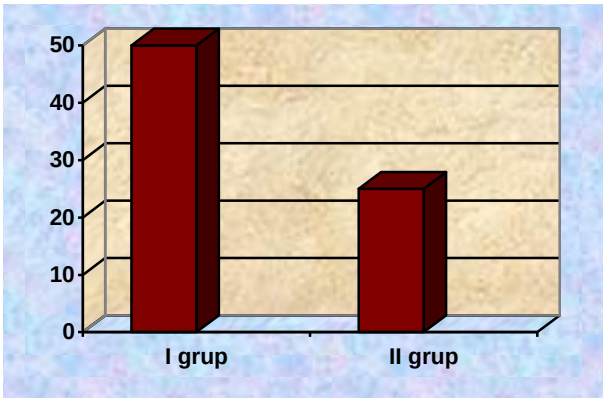


Figure 1. The distribution of the students in the 2 groups

The percentual distribution of the students in the 2 groups is(Fig. No. 2):

- First group =71,42%
- Second grup =28,58%

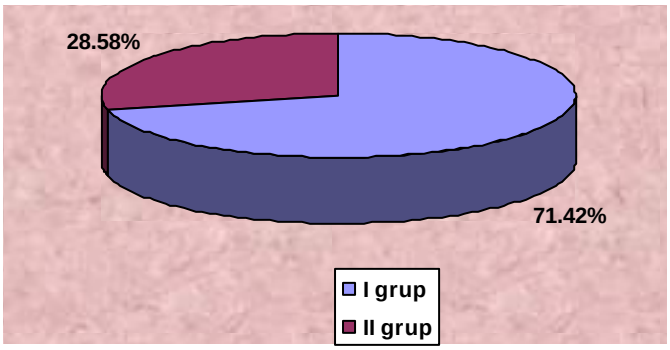
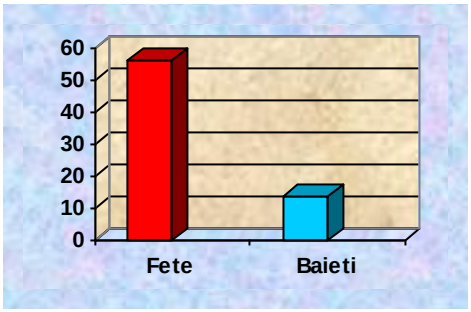


Figure 2. The percentual distribution of the students in the 2 groups

The distribution of the students by gender is represented in Fig. no. 3 and Fig. no. 4:



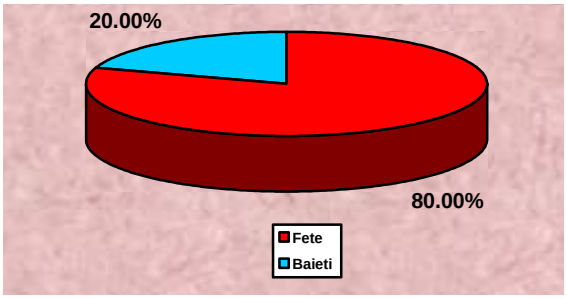


Figure 3, 4. The distribution of the students by gender

The students from the first group of study obtained variable grades at the questionnaires at Dental Morphology: 7, 8, 9 and 10.

The students from the second group of study obtained grades at Dental Morphology as follows: 8, 9 and 10.

The average of the students grades from the first group is 8.5.

The average of the students grades from the second group is 9.

In addition to the current assessment tests ("continuous assessment") we also applied a series of observations that have targeted the following information:

- Students ability to concentrate
- The frequency of the questions addressed by them
- The content of the questions
- Their quality
- Attendance to classes
- Their involvement in practical activities

Considered by Samuel C. Certo as "success factors hindering communication in a specific communication process", these micro barriers can be saw also in the communication teacher-students and there are called also process barriers, operating from the privacy process, its components and phases. [11; 12] To dissolve these micro barriers is necessary that the teacher and also the doctor to be a good leader and to know very well all the legislation and the terminology and conceptual rigors to teaching and to treat the patients. [13; -15]

CONCLUSIONS

We consider that the hypothesis from which we started in the present study was verified: students attending the Faculty of Medicine and Pharmacy, the Dental Medicine specialization as a second form of higher education, have achieved better school results at Dental Morphology compared to those who attend for the first time a faculty.

We appreciate that the grades obtained by the students of the second group, those at the second faculty, are superior to the others because they have the necessary experience of the learning process gained during the other university years, they being already gone through several examination sessions and, therefore, several dozen theoretical, practical examinations and a license. They have a specialty knowledge base wider than the others, understand easier the notions taught by the teacher, assimilate them easier, and the questions related to misunderstandings during the teaching are targeted and well formulated.

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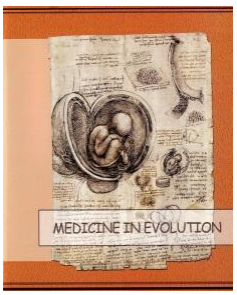
Dental Aesthetics Clinic in the context of dental flow efficiency



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Abstract

A well organized dental clinic offers the patient everything he wants. Time is limited, so patients prefer a clinic that offers all the services, without being needed to move from one clinic to another. A few years ago, patients appreciate very spacious and luxurious clinics. But things have changed. Now, they prefer an „all inclusive" dental clinics instead of very spacious clinics with limited services.

Ergonomia is a new term that has emerged in connection with Dental Medicine a few years ago. This gives us the opportunity to optimize all the activities in a Dental Clinic. A very clear and well-structured dentistry circuit in a dental aesthetic clinic reduces stress on staff and at the same time on patients.

Keywords: Dental Aesthetic Clinic, Organisation, New concept, Dental flow efficiency

INTRODUCTION

At present, there is not enough bibliography on this subject, which is why this work is a result of the experience gained daily in the dental office.

Optimizing working time is a very important factor for both dental clinic staff and patients. Nowadays, time is very precious. Patients don't have the time to wait in the waiting room for more than 10/15 minutes. Thanks to the advanced technology, any activity and information is currently being carried out at a faster pace, which does not allow us to waste time waiting.

Too much time spent by a patient in the waiting room in the dentist's office creates a discomfort for the patient and can spoil the relationship between a patient doctor due to this negative satisfaction (1).

Ergonomia is a new term that appeared in connection with Dental Medicine a few years ago. This allows us to optimize all the activity in a dental clinic. When a Dental Clinic is ergonomically arranged and structured, its effectiveness is maximal. Besides time efficiency, it also achieves a harmony in the activity performed in the dental clinic (2).

In a dental aesthetic clinic the team work is as important as it has to be well structured and organized. To optimize it, it is helpful to restructure and reorganize dental clinics. A very clear and well-structured dentistry circuit in a dental aesthetic clinic reduces stress on staff and at the same time on patients.

It is important to know that in a well-organized and structured clinic there is a need to over-specialize dentists. Each dentist has his own treatment room organized and arranged according to his needs. Thus, performance of dental practitioners can be achieved and at the same time, streamlining the flow(3).

The goal of organizing a Dental Aesthetic Clinic are that it improves working conditions for dental practitioners, it achieves a higher comfort zone for the pacient, it optimize of working time through a medical architecture and it creates greater work productivity and less discomfort for both doctors and patients.

The patient today is not interested in a very large waiting room, because he does not have an interest in spending much time in it. The trend in the past years in a Dental Aesthetic Clinic was to be large with art objects or an aquarium with fish for example. Things have changed over the past few years. Patients are stressed / pressed by time. New trends imply that they have no time to move from one side of the city to the other just for making an dental X-ray or to go to the dental technician. From this point of view, many are looking for dental clinics that offer them all the facilities in one location. They save time and money.

A dental clinic with a well planned structure need to give a optimum flux for pacient along with the doctors. The patient knows very clearly how often they should come and how long that session lasts.

MATERIAL AND METHODS

The lack of comfort for patients and dentists has led to a modern concept of a dental aesthetic clinic. The idea of this new concept of the clinic has been designed to give the patient all the facilities in a single location.

The components of this clinic can include a series of specialized treatment rooms that include all areas of dentistry, staff rooms and dental equipment. Treatment rooms have been arranged so that the patient has a well-established circuit at the first session. Afterwards, after the first session, he will have an exact planning of the route to end of his dental treatment. In order to a better visualization and understanding of the content and structure of the clinic, a descriptive plan was created.

In order to obtain a feedback from dentists, graduate students and dental technicians, a questionnaire was generated, containing questions about the components of the clinic, attached to the questionnaire. Following the obtained responses, a statistical report has been produced, which will help to improve and modify the existing clinic concept.

RESULTS

Following the statistical evaluation it was found that 95% of the respondents believe, that in a dental aesthetic clinic it is important to attach the dental laboratory and the assistant room in order to have a better collaboration, to gain time and advantage from financially. Necessary dental technician has the opportunity to observe clinical case directly, without great effort (Fig.1).

Figure 1. The importance to have a the dental laboratory and assistant room attached in a Dental Aesthetic Clinic

Regarding the position of the reception in the dental clinic the opinions were divided: 47% agree with the positioning of the reception in the middle of the clinic, because the first contact of the patient when entering the clinic is indicated to be the reception. The main reason is that patient comfort is ensured, as well as a better and clearer orientation. 38% believe that the central reception positioning is not mandatory for various reasons (Fig.2).

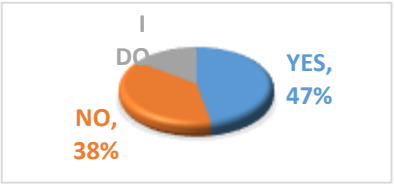

Figure 2. Importance of a reception in the middle of Dental Aesthetics Clinic

Regarding the question of the important that all treatment rooms should be at one level, so that will help people with disabilities 50% responded with yes, in order to avoid any discrimination between patients. Lack of stairs gives patients the possibility to move without assistance and the need for a companion. 42% responded with no, considering that other means of moving inside the clinic could be provided (Fig.3).

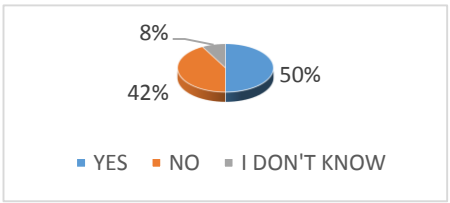

Figure 3. Importance to have the whole clinic only at a level (taking into account the international legislation on people with disabilities)

The Casey room is a treatment simulation room, that helps the patient to understand the treatment plan that the doctor suggests. Most of the respondents did not know at the begining what this means, and then they were very excited about the existence of this room (Fig.4).

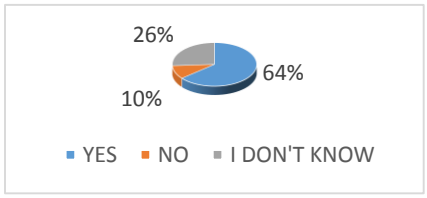

Figure 4. The necessity of a Casey room in a clinic for Aesthetic Dentistry

The need for a conference room was not considered mandatory by all participants (45% responded with no). 50% have confirmed the importance of this room in such a clinic, because they consider that the consultations between colleagues at the meetings strengthen the spirit of collegiality and lead to a properly applied and well-thought-out treatment plan. The collaboration between doctors decreases also the risk of malpractice (Fig.5).

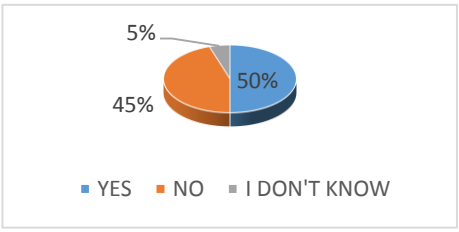

Figure 5. The importance ofa existence of a conference room

33% do not agree that to each room should be attached a sterilization and storage room. 62% think it is very important, because it prevents contamination with biological products and reduces the working time of the team. The assistance is no longer required to move from the treatment room. Besides all, this is also a proof of professionalism, the patient feels protected and relaxed, because of not having contact with any activity in the treatment rooms (Fig.6).

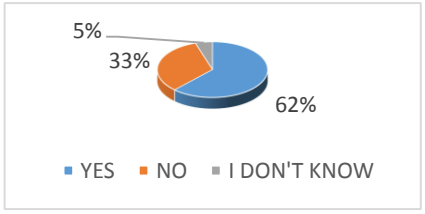

Figure 6. The importance to have a individual storage and sterilization room

Almost all of the respondents see the organization of the treatment rooms as helpful in the order mentioned in the questionnaire (Fig.7).

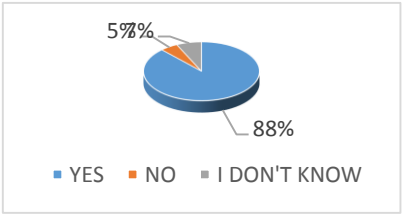

Figure 7. The organization of the treatment rooms in terms of ordering the specialties is helpful in the Dental Esthetics Clinic (for example, if the surgery room is ok positioned next to the implantology)

The location of the rooms for the first circuit of the patient is important to be well structured, organized and thought into the clinic, which is also the opinion of the consultants (fig.8).

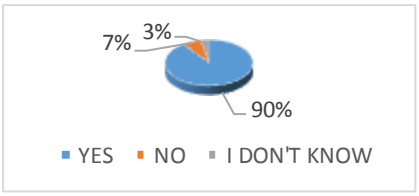

Figure 8. The rooms for the first circuit of the patient is important to be well structured in the Dental Aesthetics Clinic

Concerning the separate circuit of children and adults, opinions are divided again for various reasons (Fig.9).

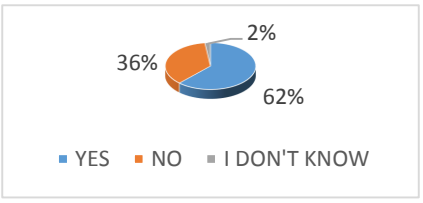

Figure 9. The necessity to separate the circuit of children and adults

Regarding the presence of a workshop room for technicians and dentists most of them agreed to its existence (Fig.10).

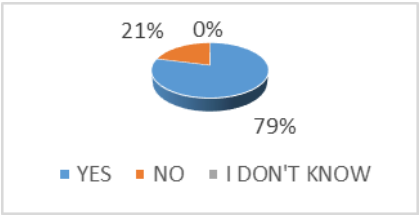

Figure 10. the presence of a workshop room for technicians and dentists

DISCUSSIONS

The proposed solution in terms of spatial organization for a dental aesthetic clinic, especially the flow of patients and medical staff, can be a very useful solution for future design.

The clinic must be organized in such a way as to ensure the shortest and most efficient way for the patient as well as for dental doctors and clinic staff. It is very important for the doctor to have all he needs in his treatment room, without forcing the assistant to leave the treatment room just to remove the used instruments or to bring needed materials, because there are no necessary materials in that room for example. When the treatment room offers all the necessities, it can save time and energy.

Also for the patients it is very tiring and stressful, when they have to look for room X on the Xth floor. It is much easier for patients if everything is organized, so that they do not have to look for the treatment room because they are all at the same level and visible from the waiting room/reception. The receptionist directs patients to the appropriate treatment room, either left, right or front, all of which again leads to saving time and energy.

It is obvious, that there is space saving if there is only one sterilization and storage room in the dental aesthetics clinic, but the time lost by the assistant, the patient and

respectively the dentist, due to the fact that the assistant has to leave the treatment room to go elsewhere after materials for example, because they are only in a single room in the clinic deposited. This kind of movement is a waste of time and should be considered.

At present, in large companys or clinics, there are experts who analyze and optimize the efficiency of staff and clients movements in that company or clinic. It has been shown that, for example, positioning the xerox far away from the reception level in a dental clinic, where the receptionist is forced to move several times a day, leads to a decrease in the flow of patients and staff respectively.

CONCLUSIONS

After evaluating the results obtained in the questionnaire, it could be seen that most of the doctors, students and dental tehnicians think that this is how the future looks like.

The results came as a confirmation that the new design/concept of the dental aesthetic clinic is greatly appreciated by the doctors, the students and dental tehnician who filled in the questionnaire. Therefore, it's very important to think about a change.

This new vision of a dental aesthetic clinic streamlines daily activity. In a well organized and structured clinic on long term time is gained, stress is reduced and, last but not least, a well-staged treatment plan will be established from the beginning.

Acknowledgements

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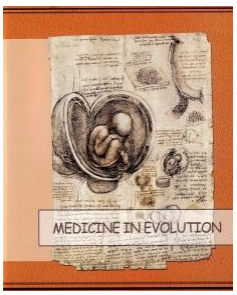
Autologous bone blocks from chin; case report



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Abstract

Implants placement has become a very common procedure in many dental offices for those cases with sufficient osseous offer. In situations of significant osseous atrophy, the elected gold standard is the use of osseous blocks from donor sites within the oral cavity. Sectioning the osseous blocks after harvesting present additional advantages: this process of increasing the augmented area allows also ease of obtaining a sufficient quantity of bone particles to be used in order to enhance revascularization. It also allows easier adaptation of the bone block to the recipient area. Each of these advantages contribute to the result that the revascularized bone will have a proper density for implant placement.

Keyworlds: autologous bone graft, bone atrophy, dental implant, chin grafting

INTRODUCTION

Implant placement at the level of maxillary bone needs a proper osseous offer in order to allow an implant to be inserted at an angle as perpendicular as possible to the occlusion plane [1]. Whereas in earlier times implantology was exclusively done where there was sufficient bone offer, modern implantology is pushed by an increased demand for prosthetics. For this reason, implants placement has often become a provocation in the areas where there is insufficient bone offer. At the level of posterior maxilla osseous resorption takes place in 2 ways: in the first case, this occurs concurrent with the extraction of the teeth; a reduction of the thickness of the bone which starts on the vestibular face. In the second case, a pneumatization of the maxillary sinuses occurs with the reduction of the bone height [1,2,3,4]. Should reduction of the thickness of the bone occur, the occlusal rapports will necessitate the placement of angulated implants and the obtaining of an inverse occlusion. For this reason we strive for either short, thick, tilted, zygomatic or surgical methods of bone augmentation more or less laborious as guided bone regeneration [5,6], ridge splitting, onlay blocks from the menton's level, ascendent ramus [7,8], parietal bones or donor areas from outside the cephalic extremity [9].

CASE REPORT

Patient, male, non-smoker, 52 years old, presented with a swelling at the level of 2.7 due to a granuloma. Clinical examination revealed horizontal bone loss at the level of 24, 25 and 26 (Fig. 1) and minor sinus pneumatization at the level of 26. X-ray examination by CBCT (Fig. 2) revealed horizontal bone loss at the location of above mentioned teeth. After the extraction of the 2.7 the site was left to heal for 2 months in order to achieve a good epithelialization of the extraction area. The donor site of the autogenous block graft was then decided; chin was preferred because of difficult access at the ramus level. One hour before surgery 2g of Amoxicillin (Antibiotice ®) were administrated as well as anti-inflammatory and analgesic Naproxen and Esomeprazole (Vimovo 500/20mg, Astra Zeneca®); Amoxicillin was continued with a dose of 500 mg every 8 hours for 5 days and Vimovo twice daily for four days. After good infiltration of the chin area with several ampoules of Ubistezin Forte (3M®) an incision was performed from 3.3 to 4.3 just below (0,5 cm) the muco-gingival line. The incision was made at a slightly obtuse angle to the bone in order to obtain greater surface area of the soft tissue for two layer closure of the wound. After raising the mucoperiosteal flap the bone was careful cleaned of any remaining soft tissue. The bone was cut first with a diamond disc (Densply ®) with protection for the soft tissue; the cut was then continued with piezosurgery (Variosurg NSK®) until the spongy bone was reached. A fine chisel was used to detach the cortico-spongy bone block; a separation of the block into two pieces was necessary in order to facilitate bone harvesting. After the block was harvested blood was collected with a syringe and placed in a glass bowl; the harvested bone was placed into this bowl. Next, the defect was filled with bovine bone (Cerabone ®) and the wound was closed in two layers to prevent any dehiscence, a very common occurrence at this level. Both bone blocks of harvested bone were separated into two pieces by longitudinal sectioning with a diamond disc (Busch ®) (Fig. 3). Then the pieces were thinned with a bone scrapper (Meta ®) also allowing obtaining of bone particles. After infiltration a flap was raised distal to 2.3: the incision was performed on the crest slightly palatal and the relief incision was made distal to the canine. After a thorough cleaning of the receptor area, every piece of harvested bone was firmly fixed with osseosynthesis screws (Trinon ®). Significant horizontal bone loss was noticed at the left posterior maxilla (Fig. 4). Particulated bone was moderate condensated between the bone block and the receptor bone (Fig. 5). After periosteal release horizontal mattress suture was used for wound closure. Panoramic X-ray (Fig. 6) at 4 months revealed

graft integration. Clinical examination revealed good bone contours and a healthy soft tissue at the level of the grafted area (Fig.7). After the flap was raised, a healthy reddish bone was noticed and 3 implants (TBR ®), were placed after osseosynthesis screws were removed (Fig. 8): in position of 2.4, L-13 mm, Ø-5 mm; in position of 2.5, L-11,5 mm, Ø-3,9 mm; in position of 2.6, L-5 mm, Ø-6 mm. After 4 months of integration panoramic X-ray revealed implants osseointegration (Fig. 9). After flap raise and insertion of the healing screws we proceeded to the prosthodontics phase.

Figure 1. Horizontal bone loss at the level of 2.4, 2.5, 2.6

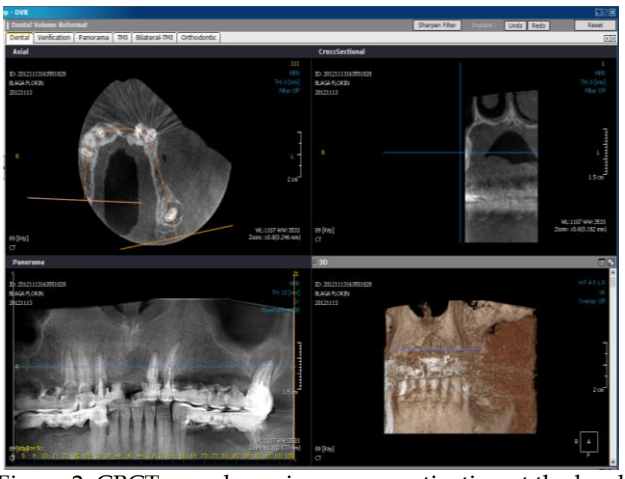

Figure 2. CBCT reveals a minor pneumatization at the level of 2.6, sufficient bone height at the level of 2.4 and 2.5 and significant bone loss at the level of aforementioned teeth.

Figure 3. Bone block graft cutting with a diamond disc

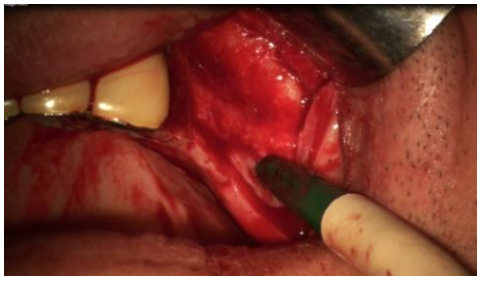

Figure 4. Horizontal bone atrophy distal to the canine

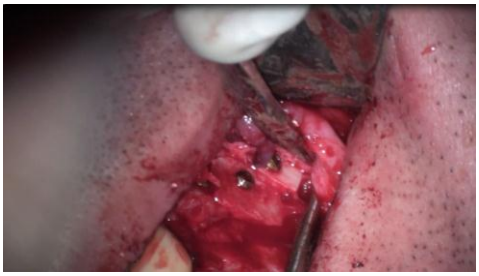

Figure 5. Several bone blocks firmly fixed with two osseosynthesis screws at the level of receptor site

Figure 6. Graft integration after 4 months

Figure 7. Healthy tissue and good bone contours 4 months after grafting procedure

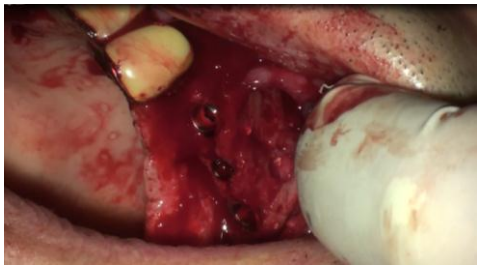

Figure 8. Implants placement into the grafted bone; graft integration can be noticed (reddish color)

Figure 9. Osseointegrated implants 4 months after their placement

Figure 10. Prosthetic abutments screwed into the implants before cementation; bone contours and soft tissue can be noticed

Figure 11. Zirconia bridge cemented on the prosthetic abutments

Figure 12. Occlusal relationship of the restoration

DISCUSSIONS

Shortly after tooth extraction alveolar bone suffers a progressive atrophy which leads to loss of bone volume and density concomitant with soft tissue atrophy [1,10]. Fixed bridge showed that if implants are placed into the bone, their position to the palatal aspect would be with at least 25° angulation. In fact, existing bridge would act like a wax-up.

In this case the bone width was more than 2 mm and bone spreading would have been possible, but bone loss was excessively extended apically, so bone harvesting from the chin was preferred. This allowed reconstruction of the entire buccal wall; consequently, the implants could be placed perpendicularly on the occclusal plane. It is important to note that only the abutment in the position of 2.6 was 15° angulated (Fig. 10). A porcelain-zirconia bridge was realized which fullfiled functional desires (Fig. 11); occlusal relationship was mostly acceptable considering the very old mandibular restoration (Fig. 12).

Harvested bone was cut longitudinaly and then thinned; this allowed us to obtain bone chips and through their use, consequently, a better revascularization; in fact, the bone block became very thin and acted as a bone barrier and space maintainer for the bone chips. It is obviously much easier to achieve revascularization of these bone chips than of the solid whole bone block graft harvested from the chin.

The fixation and the adaptation of thinned bone blocks is also very much easier than to fashion a single bone block.

Four months or even less is enough for graft integration which is half of the period needed for integration of allogeinic bone used for horizontal augmentation [11]. Implants insertion after 4 months is mandatory other wise bone resorption can occur. The use of

autologous bone reduces infection risk due, to the vital cells containt and non-use of collagen membranes; there is no risk of graft infection caused by membrane infection.

The main disadvantage of autologous bone grafting is morbidity of the donor site. Use of diamond disks reduces the time needed for surgery and the use of piezosurgery reduces edema and bone trauma [12], however. The use of Plasma Rich in Growth factors and the fibrine membrane, or fibrine clot, are also known to help in reduction of pain and swelling and in accelerating bone and soft tissue healing [13]. In this case- report was necessary to respect all the procedures for the researches with the human subjects, to respect the human rights and to inform the patients about the clinical reasearch. [14; 15; 16]

CONCLUSIONS

The use of autologous bone is the gold standard in implantology due to its facilitation of osseointegration within 4 months with proper bone density. Cutting the harvested bone longitudinally and then thinning allows obtainment of useful bone particles; it eases bone block fixation and favors revascularization and consequently bone graft integration with a proper density for implant placement.

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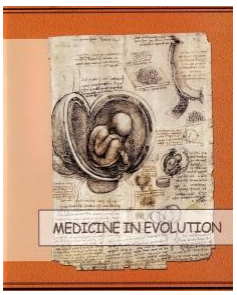
Composite layering enameloplasty in unilateral upper incisor anodontia - a case report



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Abstract

During the complex restorative-orthodontic treatment, the interventions on dental hard structures are aimed to achieve the final morphological and functional re-balance in all respects. This requires a morpho-functional dental crown re-balance by improving the number of dental stable contacts between the two arches simultaneously, to avoid premature contacts and interferences (according to the principles of functional occlusion), so to correct the performance of the dental guides and the dental guide surfaces.

***Key words**: unilateral upper incisor anodontia, restorative, orthodontic, interdisciplinary treatment*

INTRODUCTION

Anodontia (agenesia, aplasia) is defined as the absence of one tooth or several teeth in dental arch without extraction [1, 2, 3, 4, 5]. Although *Ionescu* considers that it is an improper and unrepresentative term for all clinical situations, it is still accepted between orthodontic terms, being used mostly as a generic name.

Anodontia is most common in the last tooth of each dental group (upper lateral incisor, second premolar/bicuspid, the wisdom molar) and it is considered by some authors [6] as a phylogenetic reduction of the number of teeth. It seems that female sex is more receptive to these changes. According to other authors (*Werlur* and *Rothenberger*, quoted by *Galanopoules*) [7], causative factors are constituted by local disorders, constitutional diseases, neurotrophic and endocrine disorders, and some strictly local factors. As the anomaly was found in several members of the same family, it was concluded that anodontia is a hereditary genetic disorder.

Upper lateral incisor anodontia is a reduced, isolated anodontia. Frequency of manifestation varies between authors: 2.2% - *Boboc* [1], 3.53% - *Ionescu* [2] or 9.6% - *Mecher* (quoted by *Ionescu*) [3]. In the asymmetric form it is found a normal or smaller homologue incisor; the persistence or not of the temporary incisor, and with reserved space or not.

From the clinical point of view, the asymmetric lateral upper incisor anodontia has generally the same characteristics as bilateral upper lateral incisor anodontia. The difference consists in changes concerning the asymmetry of the dental arch due to the unilateral lack of the upper lateral incisor, insufficient development of the upper arch, or frontal inverse occlusion reports.

From the therapeutic point of view, this anomaly presents similarities with the bilateral one, the problem of obtaining an aesthetic result encountering difficulties mainly due to asymmetry. To avoid solutions where dental vitality can be affected by sacrificing a significant amount of dental hard substance along with periodontal treatment, unilateral lateral superior incisor anodontia could benefit from the possibilities of coronary remodeling through composite addition enameloplasty.

MATERIAL AND METHOD

P.C., 13-year-old female patient, turned to the orthodontic service for physiological reasons, as a result of the insistence of her family, but also as a consequence of the awareness of her own physical, mental and social development (with a strong impact on feminine adolescence).

Intraoral examination revealed the following: the absence of 2.2, and the occupation of its space by 2.3; the deflection of the superior interincisor line to the left; the existence of spaces between 2.1 and 2.3, between 2.3 and 2.4, and between 2.4 and 2.5; the shortening of the upper left demi arch, but maintaining a bilateral molar *Angle* Class I. At the patient presentation, the cuspid/canine was migrated on the place of its incisor neighbor (2.3 in the space of 2.2) with almost complete closure of the space. The cuspid/canine mesial position determined the forward movement of 2.4, forming a space behind it. The vertical relations between 2.3 and 3.3 simulated a dento-labial contact (fig. 1).

Figure 1. P.C., 13-year-old female patient with asymmetric lateral upper incisor anodontia (a-e intraoral aspects)

The composite material used was Charisma®, Heraeus Kulzer, Germany, and its application technique was the stratification/layering. The application of the light cured composite material layer was made according to manufacturers' indications, manipulating it with an Teflon® spatula. We applied the layers of composite material one by one (no thicker than 2 mm), and in turn each composite layer have light-cured.

RESULTS

The correlation of clinical data with anamnesis data led us to the diagnosis of an Angle Class I anomaly, unilateral anodontia of 2.2 (asymmetric type) with hereditary etiology, affecting physiognomic, masticator and self-maintenance functions.

The orthodontic treatment aimed for a judicious redistribution of the existing space on the upper arch, for the harmonization of the interincisor lines, and for the improvement of the physiognomic deficit, relying on the inward impulse given by the 12-year molars in the eruption. The final result after two years of orthodontic treatment partially succeeded in harmonizing the dental inter-arch relationships. However, was noticed the presence of a more elongated masticatory and gingival papillae niches, distal to the "current" 2.2, showing a space excess for this tooth.

Construction of the medial and distal angles for the "new" 2.2, by adding tooth-colored hybrid composite material - selected on the specific color key, we performed it by stratification technique (fig. 2).

The operative steps were as follows:

- Tooth isolation
- Enamel etch with 34% orto-phosphoric acid (UltraEtch®, Ultradent, USA) for 20 seconds, followed by intensive rinsing, and drying
- Adhesive application (Gluma®Comfort, Heraeus-Kulzer, Germany) by brushing, mild drying and 20 seconds light curing

- Composite material application in layers. These layers were thin (max. 1 mm), applied with an oral spatula and light cured 20 seconds each. The selected composite CO nuance (Charisma®, Heraeus-Kulzer, Germany) embraced the cuspal zone, being added more in the distal area, thus constructing the distal angle. In the same time the composite was prolonged in a subtle manner on the cuspid/canine distal face, but also on the distal part of the buccal face. This additional load was made from aesthetic considerations (the new incisor to look as much as possible with the lateral incisor on the opposite side). Another reason was the mechanical strength of the plastic construction during mastication
- After the composite construction was occluded, it was finished with finishing discs (OptiDisc®, Kerr, USA) and polishing paste brushes.


a.

b.

Figure 2. P.C., 13 years-old female patient, layering composite enameloplasty for 2.3 reshaped as lateral upper incisor (a, b – intraoral aspects)

DISCUSSIONS AND CONCLUSIONS

Through the composite layering technique, which requires increased manual abilities, we can say that we have achieved a 2.3 enameloplasty with satisfactory aesthetic results. We also do not believe that there will be mechanical strength deficiencies, since the hybrid composite material of Heraeus-Kulzer was thought to honorably behave in enamel-like mechanical stress conditions in selected topographic region.

The method allowed us to choose the colors vertically in a personalized manner, resulting an aesthetically superior aspect. Instead we observed a higher curing contraction manifested as postoperative pain [10, 11]. In this case- report was necessary to inform the patients about the clinical research, and to respect all the procedures for the researches with the human subjects. [12; 14; 15]

In our research, the restorative treatment was a milestone during the complex treatment, the enameloplasty being planned and carried out after the orthodontic treatment. The requests for enameloplasty crown restoration type came from the orthodontist in the context of achieving a final contention, and to obtain a final harmony between dental-maxillary structures well established. So in this case we have opted for a variant that combined the canine cusp flattening (reshaped with diamond dental burs) with the layered application of composite material to the incision edge obtained from grinding.

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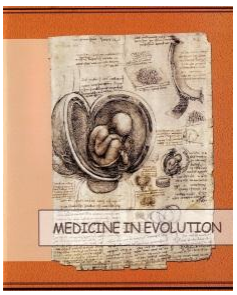
Changing the employee's attitude towards the client following dental bleaching procedures



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Abstract

Objective: Tooth whitening is one of the most requested aesthetic procedures to improve especially in the front teeth. It is known that aesthetic improvements produce changes in personal life, increase self-esteem, motivation and the right attitude towards the environment (physical and relational).

Material and method: Our study was conducted at the request of a company that wanted to motivate their employees, increasing their involvement in professional development and thus increase company revenues. The study started with 20 employees working in direct relationship with customers. The subjects were evaluated and tested by a psychologist who is specializes in labor psychology, later they were made tooth whitening procedures followed by repeated psychological testing.

Results: The results were analyzed by psychologist, following discussions with patients and employer. The tests showed that all the 20 employees have revealed significant improvements in the degree of involvement in the world of work, subjects were motivated and it was also improved their relationship with customers.

Conclusions: The improvement of aesthetically appearance aims at increasing the involvement of the subject in practice, which has a special significance when the employee enters into direct relationship with the customer.

Keywords: dentist, client, tooth whitening

INTRODUCTION

Psychologists have found that improving the patient's physiognomy aspect has beneficial effects on his / her life, in all aspects (personal, professional, social). From a personal point of view, patients who have improved their aesthetic appearance are more easily involved in social life, Are positive, often find partners, etc.

Studies have been conducted that have highlighted the increase in workplace performance in people who have intervened in the aesthetic sphere in general and in particular dento-facial aesthetics. These people are more motivated, work more and more effectively, establish social relationships Easier and more involved in the professional sphere.

In our society, white teeth are a standard of beauty, they are associated with youth, prosperity, and are standard oral hygiene.

Dental bleaching

Dental bleaching is one of the most demanding procedures in the dental office when it comes to improving the aesthetic appearance of the patient. It is the most common requirement first because it is the most noninvasive, less costly but also with immediate effects. Patients who use dental practices to whiten their teeth and are patients who do it empirically, with products purchased from stores, from the internet or even with non-popular and often aggressive methods.

The substance underlying the chemical whitening treatments is hydrogen peroxide which, by means of the free radicals that is formed by its decomposition, acts on the chromogenic complexes. Chromogenic molecules are transformed into compounds with a molecular molecule that is removed from the dental structures.

In order for the result of the whitening treatment to be a positive one, it is necessary to respect both the patient's choice of dental bleaching and the appropriate method.

Patient's anamnesis will include: general health status, drug treatments, or the use of local solutions that can cause dental discoloration, color change setting, diet and smoking, oral hygiene, existence of contraindications to chemical whitening treatments.

To be sure, dental bleaching can be done: in the dental office, home or combined (in the cabinet after which the patient continues bleaching at home).

In the office of dentistry, bleaching can be done with oxidizing or laser substances. The oxidation method is also used in 2 variants: with 35% carbamide peroxide gels applied in the cans and Maintained for 30 minutes or 35% hydrogen peroxide solutions associated with thermal or photo catalysis. The method requires mucosal isolation with classical digestive or light-curing resin, tooth drying and application of bleaching substance. After the expiry of the time according to the chosen method, Remove the gel, wash the teeth, and remove the dig.

The advantage of the method lies in the rapidity of the results, the disadvantage is the higher risk of post-whitening hypersensitivity.

The home-based method involves fingerprinting the patient's arcades and making an individual plastic body. In this neck, the patient applies 10-20% hydrogen peroxide concentrate to maintain the oral cavity between 3 -8 hours a day.

The advantage of the method is the lower risk of dental sensitivity, the possibility of re-use of the neck in case of future blemishes; the disadvantage is the duration of the whitening treatment and the selection of the patients consistent.

The two methods can be combined to achieve optimal and lasting results.

Regardless of the method used post dental whitening indications are: respecting impeccable oral hygiene, avoiding smoking, avoiding foods and beverages containing natural or artificial dyes.

The psychological effects of improving aesthetic appearance

It is known that with the improvement of the physical aspect, there is also a change in the psychological plane. The change is positive, it is noted the active involvement of the patient in tasks, the increase of motivation and optimism in both personal and professional life. Psychologists Relies on this issue in cases of depression, encouraging the patient to make a change in the physical aspect that can potentiate the effects of counseling and treatment and provide positive long-term results.

Research in this field has revealed that people who improve their physical appearance have a remarkable increase in self-esteem, a positive social development and engagement at all levels.

The practical importance of our study relates to the professional involvement in patients who improve their dental appearance through the dental whitening process. Economics studies have shown that the degree of employee involvement depends on the financial success of a company. In employees who come in direct contact with customers, the results are even more revealed.

Studies show that if the attitude of the employee is a positive one and he engages in the relationship with the client, he will be more motivated to use the services of that company than if the attitude of the employee is an indifferent or hostile one. Of the two companies that offer comparative services Price and quality, the customer will resort to the services of the company whose employees have been able to empathize with.

In order to do this, the employee, besides the facilities offered by the company, needs to have the psychological comfort to interact with the client.

One of the methods to provide this comfort is to improve the aesthetic aspect, respectively the dental bleaching.

MATERIAL AND METHOD

At the request of a business company whose employees are in direct contact with customers, we studied 20 subjects to whom we had dental bleaching. Subjects were consulted, their treatment file was prepared, and their anamnesis was done. Subjects signed the agreement to participate in the study after the whole procedure was explained and their anonymity was guaranteed, the results being processed only globally.

Subjects were taken over by a psychologist, examined and tested to determine the degree of involvement in professional activity and customer relationship before the dental whitening procedure began. As well as the methodology, the Schwarzer Self-Efficacy Questionnaire, developed by Schwarzer and Jerusalem in 1995. The questionnaire contains 10 items. Item responses were given on a four-step scale, from 1-never to 4-always.

The dental bleaching method used was combined: whitening in the cabinet, followed by whitening at home.

Each patient was initially treated for oral cavity hygiene, professional scrubbing and brushing, and the correct home hygiene method was explained and demonstrated.

Whitening in the office was performed under the same conditions in all patients. Pola Office 35% was used (SDI, Australia). The procedure involved in the application of the active substance was determined for 20 minutes. We check the color at the beginning and end of the whitening procedure, but not under our investigation.

For each product we used gingival dam. Also our own barrier to prevent contamination with saliva and any accidental exposure to the patient's soft tissue, they were applied to cotton rolls and saliva extractor.

Pola Office product is powder-liquid mixing and applying to tooth with the device found in the box. Applying to the tooth was done from the premolar to the premolar of the upper and lower.

We did not use the accelerator lamp. After the time runs out after the removal of the active substance, substance is removed. The procedure was repeated and the teeth were rinsed. We applied in total three times, two applications a week. The patients were trained to link to proper oral hygiene and avoiding foods and beverages related to containing colored pigments.

For home care, we used Opalescence PF 20% (Ultradent, USA) containing 20% carbamide peroxide, 0.5% potassium nitrate, and 0.11% fluoride ion (1000 ppm); PH 6.5

The technique consists of: impression of arcades with alginate, producing the tray for bleaching, training the patient. Give the tray and 3 syringes with active substance and written instructions on both the method and ensure oral hygiene, avoiding foods and beverages colorful and so on.

The color was determined at the beginning and at the end of the whitening procedure.

Within one month of the completion of the bleaching procedure, patients are again examined and tested by the psychologist who formulated the conclusions for each patient in our study.

RESULTS

The results were analyzed from 2 perspectives. First there was a physician-patient discussion in which he expressed his own opinion about the dental bleaching procedure, the expectations he had, the satisfaction of completing the treatment.

The items were:

Item 1-procedure was unpleasant /painful

Item 2-Satisfaction at the end of treatment

Item 3-Has changed something in the patient's life

The answers were synthesized and passed to a table.

Table I. Items post dental bleach in

Item	Women	Men	TOTAL
Unpleasant/Painful	2	1	3 (15%)
Satisfaction at the end of treatment	9	9	18 (90 %)
Has changed something in patient life	9	7	16 (80 %)

Analyzing the data in the table, we note that the treatment is not a painful treatment, which makes it easy to accept even by the anxious patients. A very small percentage felt sensitivity, but not during the treatment but only after the end of the procedure in contact with cold food and sweet on a limited operation for a few days.

The high percentage of patients, over 80-90%, who are satisfied with the result and declare ski, passion in personal life make us confirm the hypothesis from which we started.

We note that the results cannot be statistically validated; the assessment was made to confirm / refute the psychologist's conclusions and to draw attention to some particular issues that could be further improved in the continuity of further research.

Figure 1. Pre and Post Bleaching aspect in the office

The psychologist analyzed the results obtained at the beginning and end of the whitening treatment and drew conclusions for each patient. The Schwarzer Self-Test Questionnaire, developed by Schwarzer and Jerusalem in 1995, was used. It is very important in every research to respect the human rights and to inform the patients about the clinical reasearch. [11; 12; 13; 14]

The results provided by the psychologist have shown changes in the behavior of all subjects studied, with 18 of the results being highly significant; the results are superficial in 2 outcomes. Both patients are male.

CONCLUSIONS

From the results obtained and from the psychologist's assessments, we can conclude that improving the aesthetic aspect of the patient leads to significant changes in his life, both in personal and professional terms. There is an increase in the employee / patient's interest towards the work place, the increase of the internal motivation which results in his active involvement in the relationship with the clients and implicitly in the increase of the employer's income.

The present study also has certain limits. First of all, remember the small size of the sample on which the study was conducted. For this reason, the results are purely indicative, and cannot be generalized over a wider population. It is therefore necessary to carry out studies on larger and representative samples to reapply these results.

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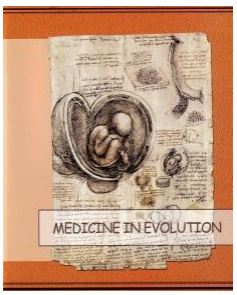
Canine ectopia – a consequence of the loss of temporary teeth



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Abstract

The premature loss of temporary teeth represents the most frequent cause of canine ectopia. It can be an isolated anomaly, but, in the most common cases, it is associated with dento-maxillary disharmony with crowding. Purpose: the study aims to present the incidence of this dento-maxillary anomaly to the investigated group, as well as the consequences it has to the dental arches and the occlusal relationship.

The material and the method: in this study were included and examined 120 children, 65 girls and 55 boys, aged between 9 and 16 years, on a period of 2 years. The studied group was structured into three age groups: 9-12 years 40%, 13-16 years 52% and over 16 years 8%. To every child from the examined group was made an observation paper similar to the one of the Dentistry Clinic; it was analysed the orthodontics documentation of the beginning of the treatment which consisted of: panoramic radiography and study models on which it were made measurements

Results: The frequency of canine ectopia is 20% to the investigated group; girls being more affected 52%, as well as children from urban areas 73%.

Conclusions: canine ectopia is a dento-maxillary anomaly which is discovered late as it is the outcome of a previous dento-maxillary disorder. The decreasing of its occurrence could become one of the main objectives of pedodontics by maintaining and treating temporary teeth.

Keywords: canine, ectopia, temporary teeth

INTRODUCTION

The crown integrity of the III, IV and V temporary teeth will provide enough space for the eruption of the successor canine and premolars and their correct position will establish a functional occlusion both vertically and sagitally. Tooth decay at any extent can narrow this vital space, which is constantly pressurized by the ongoing attempt of the first molars to mesialise[1,2]. This can lead to a frontal or lateral crowding that will eventually establish a disfunctional occlusion[3].

The most important deciduous teeth are III, IV, V, Adams and Love, found that the distal migration of the anteriors is less common than the mesial migration of the lateral teeth, especially in the mandible. In most children, the arch space and the outcome of the occlusion was influenced by the premature extraction of the temporary molars and canines.[4,5,6].

The pattern of temporary teeth exfoliation determine that the most common ectopic upper tooth is the canine, although, the causes that can determine this anomaly can concur a long time before it' s eruption. Therefore the canine displacement prevalence varies widely according to age and gender.For instance in a child collectivity of ages between 7 and 14 years old the prevalence is 2.7%. If the survey is performed on the same group but considering the children between 12 and 14 the incidence becomes 12,7%.

The canine displacement alone or associated with other dento–maxillary anomalies, occurs in 20% of all patients. As for the localization we came across the following proportions: bimaxylary ectopy 9%; upper arch ectopy buccaly 61%; palatal upper arch ectopy 24 %;buccal lower arch ectopy 5%; lingual lower arch ectopy 1%.[7]

Objectives:

This study consists in establishing the prevalence of this anomaly and its consequences on the normal occlusion.

MATERIAL AND METHOD

We considered a group of 120 children of which 65 are girls and 55 are boys. The children come from different back grounds, rural and urban and they came to Dentistry Clinic in Oradea to seek for orthodontic treatment from September 2014 to October 2016.

The age group varied between 9 to 16 years old.

Each child was examined and a clinical chart was performed and also several paraclinical investigations including dental casts.

RESULTS

Among the 120 children, the gender percentage was 54,1 % female and 45,9% male.

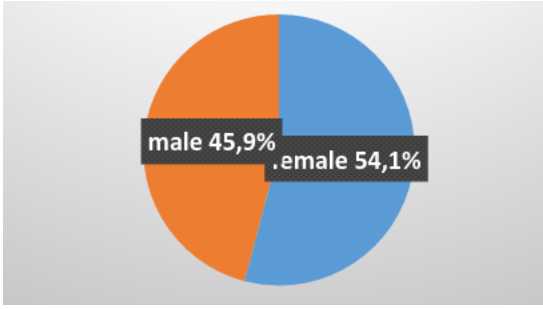

Figure 1. Gender distribution in patient lot

The prevalence of the canine ectopy was 20% (24 cases). The gender distribution among children with displaced canines, 14 boys (11,6%) and 10 girls (8,3%).

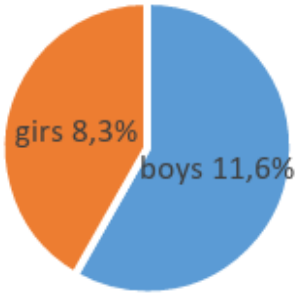

Figure 2. Gender distribution in canine displacement lot

As we observed that the ectopy was present in such a large number of cases we decided to try to establish some correlations between gender and social background, considering the importance of this tooth to normal long term stable occlusion.

The most common is the buccal upper ectopy 75% and the palatal ectopy is 25%. Another factor we considered was the one side ectopy, or bilateral: as the unilateral is 58% while the bilateral is only 42%.

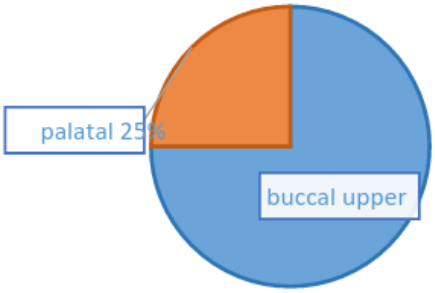

Figure 3. Clinical presentation in ectopy

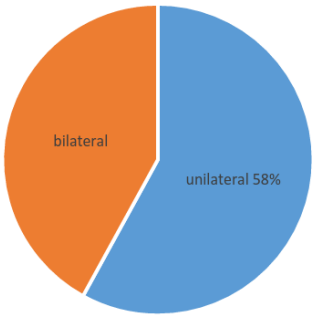

Figure 4. Prevalence according to localisation

We found that from the background point of view the outcome is uncommon because the percentage of ectopic canine patients is 60% urban and just 40% rural.

As for the age stages that are most commonly affected, we found that the age group of 9 to 12 has a 40% prevalence. The prevalence slightly grows to 51% in 13 to16 age group, than it diminishes to a 9 % in children over 16 years old.

It is obvious that the decrease in prevalence is due to the eruption period of the canine and not to the decrease in caries morbidity.

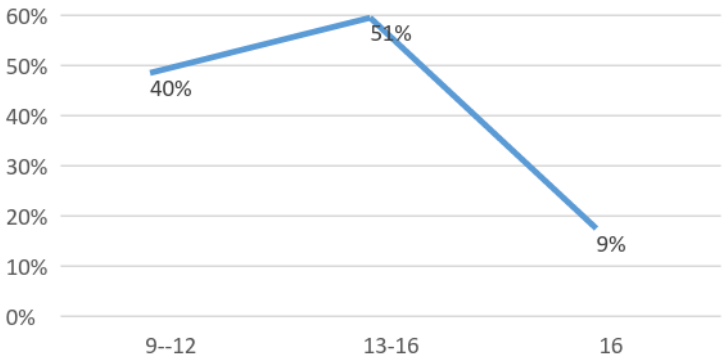

Figure 5. The prevalence according to age group

According to the specific etiologies of the canine ectopy, the lack of space due to early loss of the primary canine, both one side or bilateral, has resulted in a 65 percentage and just 35% was due to other associated anomalies.

As for the treatment outcome the most difficult part of the therapeutic plan was, in all patients, the lack of space to mesialise and retract the displaced canine.

The space gaining method used in our study group was extraction in cases with severe crowding (more than 5 mm space required).

We extracted: first premolars 85%, second premolars 10%, first molars 5%. The decision to extract was taken considering the tooth decay of the extracted teeth and the amount of space needed.

CONCLUSIONS

When a milk tooth is extracted prior to its exfoliation period the results is catastrophic for the development of the dental arch and also for the normal functions of the dento-maxilary complex.

1. the prevalence of canine ectopy is 20% with an average of 11,6% male and 8,3% female,
2. as for the most common localization is the unilateral buccal form;
3. the highest prevalence in age groups is between 13 and16 years old
4. from the etiologic point of view, 65% had space decrease due to distal teeth mesialisation because of premature primary teeth extraction
5. treatment plan was in 35 % non-extraction and 65% extraction
6. the most common extracted tooth was the first premolar 85%

Canine displacement is an anomaly that is discovered late in mixed dentition but the causes that lead to this abnormal tooth position starts with the proper treatment of deciduous molars. We concclude that dental prophylaxis of tooth decay can therefore decrease the prevalence of tooth displacement.

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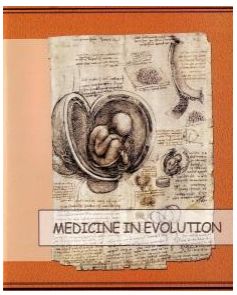
Statistical study on aesthetics, functionality, prophylaxis – triad in dental therapy performed by metal-ceramic works without affecting the marginal periodontium



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Abstract

Objective. This study aims to evaluate the importance of proper reabilitation of toothless patients with the help of fixed metal-ceramics prosthetics. Metal-ceramic prosthetics are currently the most requested option of treatment when it comes to toothless restaurations. The reason is on the one hand the affordable price and on the other hand the aesthetic, functional and bio-prophylactic qualities of these dentures.

Material and method. From 2014 to 2016 we have taken into account 50 patients that opted for fixed metal-ceramics dentures. The patients were examined, had their medical charts done, had photos taken, both before and after prosthetic restauration and were analyzed by way of functionality. We also analyzed marginal periodontium reaction after final cementation of dentures after 1 month, 3 months, 6 months and 1 year intervals.

Results.The results were noted in charts and graphics. From the analysis we observed that for 47 of the patients the dentures were aesthetically appropriate, for 48 of the patients were functionaly appropriate and for 45 of the patientsthe dentures were appropriate as far as prophylaxis goes.

Conclusions.Our study concluded that if correctly done in metal-ceramics denture can fulfill all three desideratum, aesthetic, functional and prophylactic, at an affordable price.

Keywords: patient, metal-ceramic, aesthetic, functional, prophylactic

INTRODUCTION

In the context of the optimal restoration of basic dento-maxillary functions (physiognomy, phonation, mastication), the mixed metal-ceramic crown occupies an important place in today's dentistry because it combines the advantages and eliminates the disadvantages of the whole ceramic crown with those of the metal restorations.

The data from the literature show that the correct metal-ceramic works are effective both prophylactically and aesthetically and functionally. Confirmation of this hypothesis will stimulate patients to opt for this kind of prosthetic works at the expense of cheaper and less efficient works from these view points.

Improved appearance occupies an increasingly important place in restorative dental medicine. The face and especially the smile have a great impact on human relationships. There is more and more talk of the "smile power" for success in society. Medical dentist has the ability to make smile more beautiful and by improving self-confidence to change the course of a person's life.

Although aesthetic treatment appears to be of great importance for the patient's self-safety and personality, the central focus of treatment remains oral health. A treatment based on purely aesthetic principles has limits. The patient should be advised in this regard. This can only be done by a dentist who is mastering the therapeutic methods and materials used in the slightest detail.

Often, patients are more interested in the aesthetic aspect of restoration than functional. The social impact of facial physiognomy, the desire to appear as young and pleasant as explains this change of attitude.

However perfect a functional prosthesis restoration, if we do not take into account the patient's physiognomy and personality, it can be considered a failure. The patient's ability to maintain normal facial expression is probably the most important psychological factor for accepting fixed or mobile prostheses. The treatment of a patient depends by the relationship between doctor and patient. When the patient is for medical services, he expects primarily to be heard, understood, to recount all the sufferings, not necessarily those strictly related to the specialty which presents, to answer the question and his concerns to leave doctor with a greater peace of mind and then to be treated.[8; 9; 10; 11]

Although observance of basic aesthetic elements is imperative in aesthetic restorations, some clinical aspects need to be considered to ensure the overall quality of the restoration. Besides the aesthetic aspect, the restaurants have to be functional. As Dr. Peter Dawson says, "Aesthetics and functionality go hand in hand: the better aesthetics, the better the functionality, and the opposite."

Another requirement of all aesthetic restorations is to achieve physiological outlines that ensure good gingival health.

Care should be taken to ensure that all treatments suit the gingival areas of the restaurant, remove any excess of material at this level. The marginal areas of the restaurant must be physiological and should not press the gum tissues.

Conditions imposed alloys for metal-ceramic technique:

- a melting range of alloys for metal-ceramic technique with minimum 150 degrees higher than the range-200o C sintering ceramics (850o-1100o C), but not over
- resistance to high temperatures, do not sag during sintering ceramics
- a thermal expansion coefficient greater than or at least equal to that of the ceramic solidification shrinkage to 1.6%
- an enabling age-hardening;
- a yield strength to be increased residually
- one to ensure optimum adhesion of the ceramic masses;

- biocompatible and resistant to corrosion;
- alloy must submit a color fidelity and have a good flow ability
- a 1300o C titanium alloys are only compatible with ceramics with high sintering range (1400o C)

Table I. Classification by Craig

Noble alloys	**Non noble alloys**
Alloys with high content of Au	Alloys based on Ni-Cr
Alloys based on Au- Pd	Alloys based on Co-Cr
Alloys based on Au-Pd-Ag	Alloys based on Ti
Alloys based on Pd-Ag	
Alloys based on Pd-Cu	
Alloys based on Pd-Cr	

MATERIAL AND METHOD

In the period 2014-2016, we studied 50 patients who presented themselves for the purpose of carrying out fixed metal-ceramic prosthetic works. First, we studied a group of 62 patients, 12 patients were eliminated from the final study due to non-cooperation.

All patients, regardless of which type of prosthetic work was going to be executed, were undergoing same treatment protocol: medical history, consultation, observational drawing sheet, embodying the treatment plan, explanation of treatment, the patient's written consent. The teeth grinding was used for all patients, sanding method threshold.

Pre and post reparative photos were then performed, analyzed for prosthetic restoration functionality. We also analyzed the reaction of the marginal periodontium after the final cementation of the prosthesis at 1, 3, 6 months and 1 year.

There were the following variables:

- Criterion 1: Occlusal functionality
- Criterion 2: Aesthetics as close to the natural appearance of the tooth as possible
- Criterion 3: Marginal adaptation
- Criterion 4: Taste and odor in the mouth
- Criterion 5: Prosthetic integrity

Responses were compiled in tables, the results are analyzed and conclusions drawn.

RESULTS AND DISCUSSIONS

Table II. The obtained results after processing of data, in reference to the criteria set

Determination / **Criteria**	***Metal-ceramic*** (50 patients)			
	1 months	**3 months**	**6 months**	**1 Year**
Criterion 1: Occlusal functionality	50	50	50	50
Criterion 2: Aesthetics	50	50	50	45
Criterion 3: Marginal adaptation	50	50	50	47
Criterion 4: Taste and odor in the mouth	0	0	2	7
Criterion 5: Integrity	0	0	0	3

Criterion 1: Metal-ceramic prosthetic works are recognized for functionally appropriate restoration when the treatment steps are followed. It is also important that as

outlined in the table above, the functional criterion is maintained over time, even after one year, functional parameters are the same.

Criterion 2: From aesthetic point of view, it can be noticed that up to 1 year there were no changes to this criterion. In 1 year the first notifications appeared from this point of view, respectively, in the 5 patients there were found changes. Colour in the joint area both at the level of the prosthetic work and the marginal gingival.

Criterion 3: The marginal adaptation was only suffered after 1 year and only in 2 patients, which indicates that metal-ceramic work is an important option when we consider the health of the marginal periodontium.

Criterion 4: Appearance of unpleasant smell and taste in 2 patients after 6 months and at 7 after 1 year we investigated it further and concluded that it was due to non-compliance with the appropriate oral hygiene.

Criterion 5: In 3 patients we found at one year to affect the integrity of prosthetic work by fractures or cracks in the vestibular face.

CONCLUSIONS

Following our study, we can conclude that:

- Actually executed metal-ceramic work is a very good option when we have to opt for a fixed prosthetic work
- From an aesthetic point of view this work corresponds to it, it can be individualized both in terms of colour and morphology, so that it is brought very close to the appearance of the natural tooth, making the differences even impossible to notice for the unseen observer. Changes from an aesthetic point of view which we found were in all patients who did not respect their oral hygiene, in the 1/3 area, even at the time of deposition of bacterial plaque in the cabinet.
- From a functional point of view, the prosthetic work corresponds to all the patients in our study, masticators, restoration of occlusal morphology and observance of functional occlusion criteria. This criterion is maintained even after 1 year after cementing the work in all patients.
- From a prophylactic point of view, the fixed metal-ceramic bridge corresponds to the patients where the oral hygiene norms were observed, being a good option even for the patients who had problems at the marginal periodontium.

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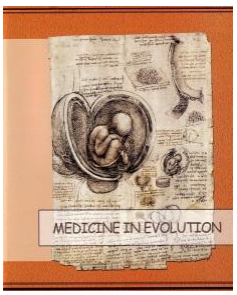
Fem study on the biomechanichal behaviour of the mandibular reconstruction plates



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Abstract

Objective: Our primary goal is to investigate, using finite element analysis (F.E.A.), the biomechanical behavior of the mandibular primary reconstruction plates. The purpose of this paper is to find out if these plates offer enough stability and a good mechanical performance when used to reconstruct jaw defects after a mandibular body segmental resection.

Materials and methods: Using a 3D reconstruction from CT images, we made a study model reproducing the complex geometry of the mandible-primary reconstruction plate binomial. Using FEA, we measured the stress generated both in the bone and inside the plate, as a result of occlusal loading. We analyzed the data to obtain a prediction on the usage of this reconstruction method following a mandible body segmental resection.

Results: Our analysis showed a good biomechanical performance of the mandibular primary reconstruction plates.

Conclusion: Mandibular primary reconstruction plates can be used for bridging a mandibular body defect, showing good biomechanical performance and stability these results should, however, be validated through large clinical studies.

Keywords: reconstruction plate, biomechanical behavior, finite element analysis

INTRODUCTION

Bridging mandible defects after a segmental mandible body resection is, nowadays, a challenge that rises before most surgeons [1, 2]. The multitude of reconstruction methods in use [1-8], as well as the controversial data found in the literature regarding each method's advantages and disadvantages, not to mention the lack of uniformity between studies investigating the biomechanical performance of mandibular primary reconstruction plates [2], justifies, in our opinion, a farther analysis of these plates' behavior through finite element method (F.E.M.). Traditionally known as a branch of solid mechanics, F.E.M. grew to be nowadays frequently used in engineering. Basically, F.E.M. is a numerical method for solving complex problems of engineering, based on subdividing a large problem into smaller, simpler parts that are called finite elements. It is based on creating a mathematical model capable of solving complex equations. The practical applicability of this method is a result of both it's generality and it's suppleness. In our case, F.E.M. allows studying the mechanical behavior of both the plate and the bone.

Aim and Objectives

Our primary goal is to investigate, using finite element analysis (F.E.A.), the biomechanical behavior of the mandibular primary reconstruction plates. The purpose of this paper is to find out if these plates offer enough stability and a good mechanical performance when used to reconstruct jaw defects after a mandibular body segmental resection.

MATERIAL AND METHOD

To obtain the model to be analyzed, we used CT images which were imported in 3D MIMICS, an image processing software for 3D design and modeling (Materialise, Leuven, Belgium). A three-dimensional mesh of a mandible reconstruction was constructed. We allotted the spatial system coordinates XYZ to the model. The origin of the axis system was established in the middle between the two mandibular condyles. Materials were assigned a Young's modulus as well as a Poisson's ratio, which can be seen in table 1.

Table I. Young modulus and Poison ratio

Material	Young modulus (Mpa)	Poison ratio
Bone	12000	0.33
Titanium	105600	0.34

Discretization: The full model was subdivided, resulting a net consisting of 43481 knots and 173298 tridimensional elements. Also, we used contact-type elements for the contact areas between the plate and the bone.

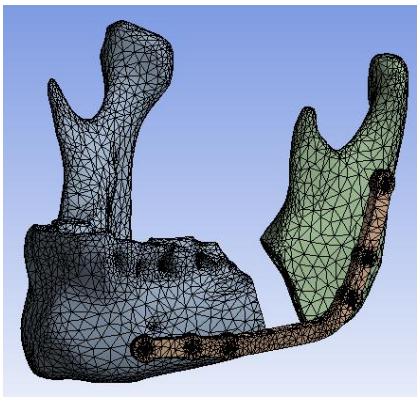

Figure 1. The discrete model

F.E.A. was performed using ANSYS (ANSYS, Inc., Canonsburg, PA, USA). In accordance with the F.E.M. principles, the analysis was performed on the numerical model created and not on the object itself.

The loading and the support conditions were used to simulate the real functioning of the mandible-plate binomial. The occlusal forces were allotted as following:

- In the first case, a 110 N force was applied in the frontal region (figure 2), to simulate the incision made by the incisors.
- In the second case, a 300 N force was simulated corresponding to an occlusal loading for the molars on the contralateral side (figure 3).

In both situations, a condyles movement of 2 mm was allowed.

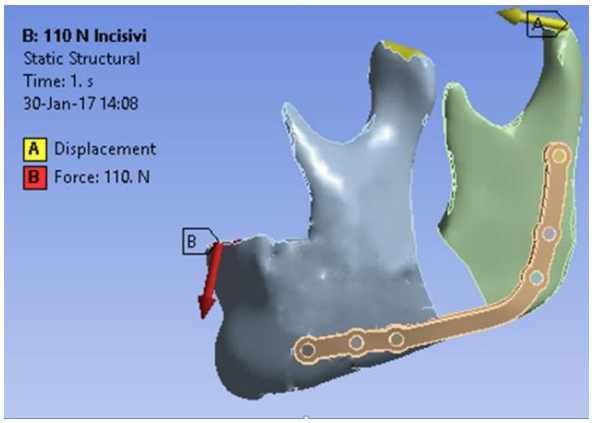

Figure 2. Loading and blocking conditions in case I

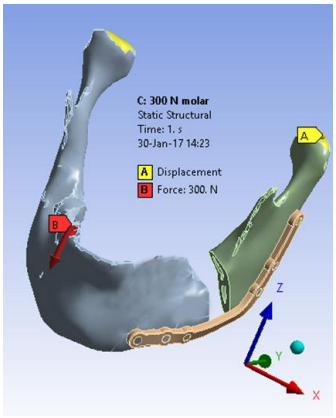

Figure 3. Loading and blocking conditions in case II

RESULTS

The numeric analysis tries to determine the stress and the deformation for both components (mandible and plate), as well as for the interface between them. Figures 4 and 5 show the equivalent displacement for the two analyzed situations. Both show a maximal displacement in the frontal segment of the mandible, as expected. Also, the displacement recorded at the mandible-plate interface is extremely reduced, which leads us to conclude the good stability of the bone-plate ensemble.

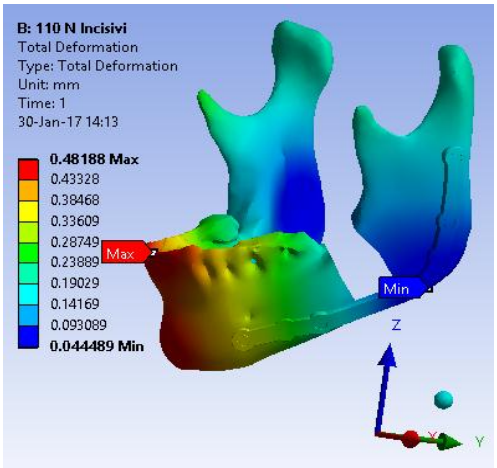

Figure 4. Total deformation variation (equivalent) in case I

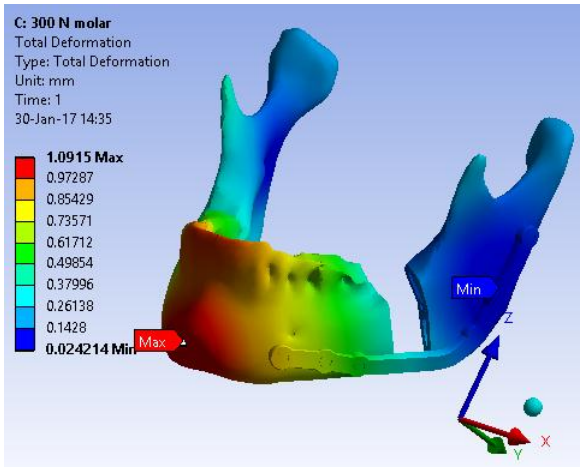

Figure 5. Total deformation variation (equivalent) in case II

In order to illustrate the stress in the mandible-plate ensemble both for the two components (bone and plate) as well as for the interface between them, next figures show the equivalent stress variation, according to von Mises criterion.

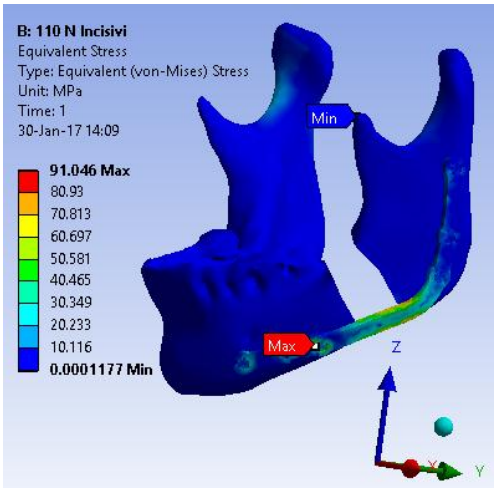

Figure 6. Equivalent stress variation in case I

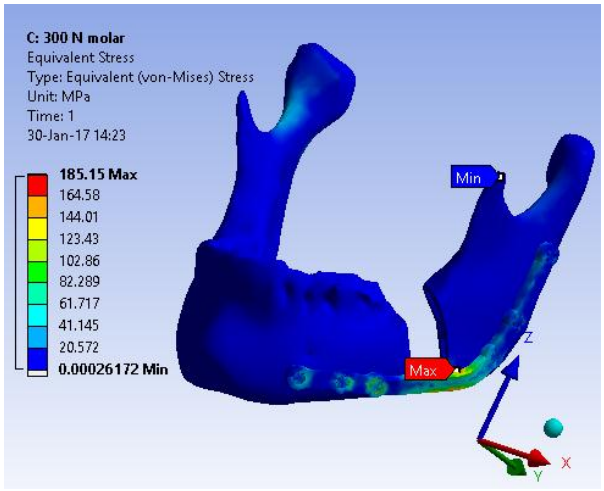

Figure 7. Equivalent stress variation in case II

Analyzing data in figures 6 and 7, we conclude the maximal stress in the metallic component (reconstruction plate) and in the screws, which offers good premises for the osseointegration, leading to a good stability for the mandible reconstruction plate. Also, in the first case, the stress values are lower than in the second case. In both situations, the values are in the elastic deformation range for the investigated alloy (does not change shape), the yield point for the Ti alloy being around 400 MPa. (ref. www.matweb.com).

DISCUSSIONS

Mandible primary reconstruction plates are, nowadays, fervently used devices for bridging mandibular defects that follow mandible segmentary resection, as a necessity procedure in various malignant and benign tumors [4]. The Ti-Al-V plate bridging offers a good positioning for the bone segments [4], with positive impact for eating and upper airway patency [4]. Despite these advantages, literature data record also a number of related mishaps. Gutwald et al. Find a 5-47% complications that lead to the necessity of plate removal [2], but they conclude that these are mainly due to plate exposure, tissue necrosis and infection. The incidence of plate fracture is low, ranging between 0% (Militsakh cited by Gutwald) and 18% (Sakakibara cited by Gutwald) [2]. Even more, Gutwald, Jaeger and Lambers conclude a maximal equivalent stress variation in the same plate area as we do (fig.6,7), and advocate individualized mandible reconstruction plates, as a way of decreasing stress by 31% [2].

Our conclusion regarding a good biomechanical behavior of the mandibular primary reconstruction plates corroborates with a retrospective study made by Paul et al. on 36 patients, which shows good plate stability and no sign of screw loosening 3 month, 1 and 2 years postop. [3].

Si-Myung et al. [6] also conclude a good biomechanical behavior of plate-mandible ensemble. They explain failure as a result of the stress induced by bending the plates to accommodate them with mandible's anatomy. This is corroborated by Reitemeier et al. [4] who advocate using individualized prebent plates. Şanal et al. find stress values in the plate-bone ensemble within acceptable range, both for bridging mandible body segmentary defects and symphysis defects [7].

CONCLUSIONS

Mandibular primary reconstruction plates can be used for bridging a mandibular body defect, showing good biomechanical performance and stability.

These results must be validated through large clinical studies.

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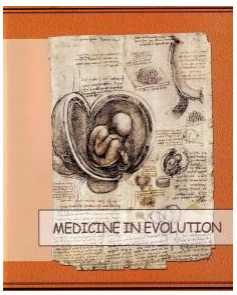
Study concerning the inclusion of the mandibulary wisdom tooth



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Abstract

Mandibular third molar is the most frequent tooth in the position of inclusion. Depending on its place, the inclusion can be intra-osseous or osteomucous. From a topographic point of view, it can be unilateral or bilateral, alveolar or ectopic[1]. In this study we have used panoramic and retro-alveolar radiography in order to examine patients who do not have in their oral cavity one or both mandibular wisdom teeth. The order of the total impaction frequency of lower wisdom teeth is: mesioinclined, vertical, horizontal and distoinclined with small percentage. From the point of view of the depth, osseous and osteomucous inclusion both hold approximately by 50%.

Keywords: inclusion, mandibulary wisdom tooth, radiography

INTRODUCTION

According to Ricketts, about half of the population needs to undergo wisdom tooth removal. The main cause consists of the phylogenetic regression of the jaw, togheter with the resulting lack of space[2]. According to Lyth, less than 5% of adults with a complete dentition have enough space for the eruption of the third molar. Therefore, the wisdom tooth plays a dominant role in inclusion incidence[3].

Implant positioning of the wisdom tooth and it's relationship with the adjacent anatomical elements: soft tissue and bone tissue are aspects that need to be given as much attention as possible, thus the complications generated by the eruption can be prevented[4].

The X-ray represents a very important examination, sometimes even indispensable for obtaining informations regarding the third molar since its formation [5].

MATERIAL AND METHOD

In order to study the inferior wisdom teeth, we used panoramic and retroalveolar radiography. In the first stage we need to establish whether there is a case of inclusion or anodontia of the third molar. After we determine that we are dealing with inclusion, we need to measure the angle between its axis and the line tangent to the premolars' and molars' cusps = angle α, therefore establishing the inclusion type [6]. If we can not trace the occlusal plane on the retroalveolar radiographs, we will determine the angle obtained by intersecting the axis of the third molar with the axis of the mandibular second molar = angle β. Then angle α = 90- β (figure 1) [7].

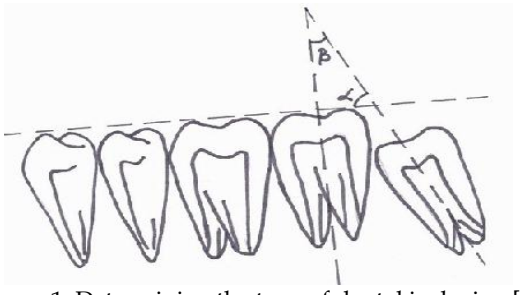

Figure 1. Determining the type of dental inclusion [6]

A number of 143 patients that did not present one or both of the inferior wisdom teeth were radiographically studied. Out of the group, 29 patients presented partial inclusion and 114 presented total inclusions. Since only panoramic radiographs provide simultaneous data on the two lower third molars, and because not all patients have retroalveolar radiographs on both molars, we could not determine how many patients have single or bilateral anodonatia.

RESULTS

From a total of 186 third inferior molars that were studied, 39 were in partial inclusion (20.97%) and 147 in total inclusion (79.03%), of which 75 were included in osteo-mucous and 72 in osseous inclusion. (Figure 2).

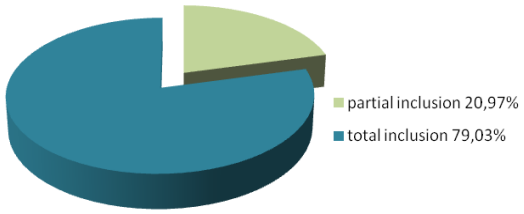

Figure 2. Procentual graphic representation of mandibular third molars, classified by inclusion type

Mandibular third molars in partial inclusion are distributed as follows: 31 in the tooth axis (vertical position - 79.49%), 3 in sagittal horizontal position (7.69%) and 5 mezoangulars = mesio-inclined; Middle inclined inclusion; Mesial-inclined (12.82%). We have found no mandibular third molar semi included (partially included) in the distal-angular position; Distal-inclined (Figure 3).

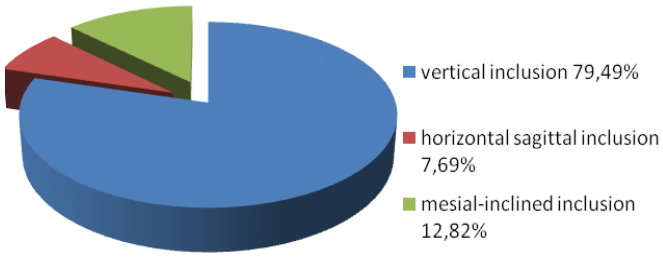

Figure 3. Procentual graphic representation by the position of mandibular third molars in partial inclusion

Molars in total impaction can be osteo-mucous or osseous. Out of the 75 molars in osteo-mucous impaction, 31 are in vertical inclusion, 12 in horizontal sagittal inclusion, 22 are mesioangular and 10 are distoangular.

Of the 72 molars in osteo-mucous impaction, 18 are found in vertical inclusion, 25 in horizontal inclusion (13 sagittal and 12 transversal), 29 are mesioangular and none is distoangular.

Procentual graphic representation, by position, of the molars found in total inclusion can be seen in Figure 4.

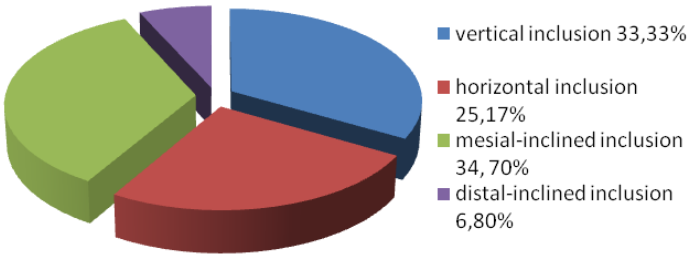

Figure 4. Procentual graphic representation, by position, of molars in total impaction

In Figures 5, 6, 7 and 8 we present the positions in which the mandibular third molars can be included: vertical, horizontal, mesioangular or distoangular.

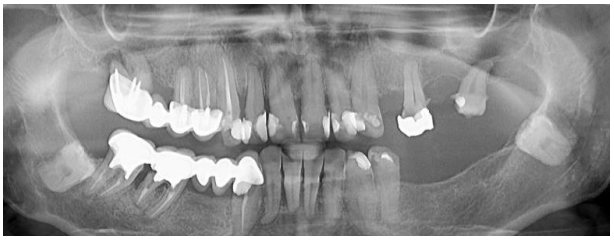

Figure 5. 38, 48 in vertical impaction

Figure 6. 48 in horizontal impaction

Figure 7. 48 in mesioangular impaction

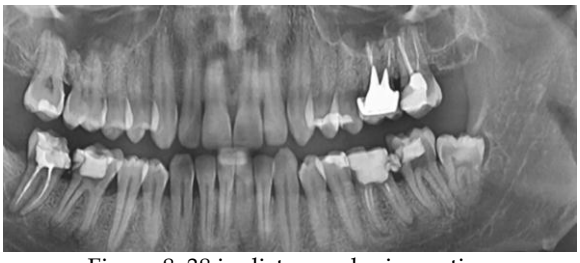

Figure 8. 38 in distoangular impaction

DISCUSSIONS

The mandibular third molar may be included, often asymptomatic, may exhibit an eruption-related pathology or, after being erupted in the oral cavity, may exhibit all common injuries to any arcant tooth, from dental caries to pulpal periapical lesions, Lesions of the marginal periodontium and ending with the root radical.

Included inferior wisdom teeth may remain for a prolonged period of time without any clinical manifestations, often being accidentally discovered through an x-ray examination, or may cause a series of accidents and complications, forcing the patient to go to the dentist.Clinical diagnosis, in cases where it develops without disturbances, is made on the finding the absence of the wisdom tooth that the patient does not remember being extracted, through the movements of the medial teeth, a vestibular bump found distal to the second molar.

The diagnosis of dental impaction is based on the radiological examination. The radiographic investigation methods used did not provide the opportunity to determine whether inclined impactions are sagittal or transverse. For this purpose special incidences are required, associating at least two at a time, thus the situation of the included third mandibular molar can be as accurate as possible. The introduction of imaging through cone beam computed tomography (CBCT) in the maxillofacial field has broadened the horizon regarding the use of tridimensional (3D) imaging as a diagnostic and treatment planning tool for oral and maxillofacial surgeons. In the clinical research in present is really important to complete the informed consent. [8; 9; 10]

The treatment indicated in the inclusion of the mandibular third molar is radical or conservative surgery in relation to the shape, position and depth of the tooth in the bone, the existence of sufficient space on the arcade, the patient's age, the condition of the bone and the complications that inclusion has caused.

CONCLUSIONS

Regarding inclusion type of the inferior wisdom tooth, the obtained data is close to that found in dental literature. The order by frequency of total inclusion of mandibular third molar is: mesioangular, vertical, horizontal and distoangular.

Regarding inclusion depth, osseous and osteo-mucous inclusion both hold about 50% incidence.

Radiological examination is an indispensable investigation in obtaining information about the third mandibular molar starting with its formation.

The lack of space required for the eruption ranks first among the causes of the inclusion of the mandible of the mandible, as a result of the differences in teeth size and the size of the jaw. This mismatch can be determined between 9-11 years, or even earlier, through cephalometric investigations.

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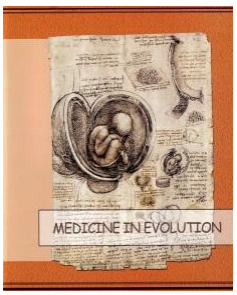
Dental bleaching: a review of the literature



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Abstract

This article will help dentists to review their knowledge about: history of bleaching procedures, bleaching types, discolourations and components of bleaching systems. Types of discolourations and stains, types of bleaching, systems are reviewed. The overall goal of the article is to help the clinician choose the best bleaching system for every clinical situation.

Keywords: bleaching, discolouration, stains

INTRODUCTION

In a time when bleaching in the dental office is more and more requested by patients, dentist face the dilemma of doing or not doing the bleaching treatment. Bleaching is not just a yes or no type of treatment especially because of the intense publicity on all the media channels that generates a larger number and wider range of patients expect and ask for whiter teeth. Patients that request bleaching treatments range from children to senior citizens, from the ones with a single discoloured pulpless tooth to ones with a completely yellow stained smile for several years. Some may have tooth discolouration as the only problem while others may have caries, tooth alignment and periodontal problems that require primary attention.

The history of dental bleaching can be traced back approximately 4000 years ago in ancient Egypt when a shinier smile and whiter teeth was a sign of health and beauty. To obtain this they were using a mix of ponce rock and wine vinegar or prepare a cleaning dust from salt, iris flower and pepper. This was applied with a used wooden stick on the surface of the teeth [1].

The discovery of fluoride, in 1802, opened new possibilities for dental bleaching, preserving enamel integrity and lowering the number of dental caries. This breakthrough discovery that is part of our modern medicine today has of course its limits. Fluoride isn't the the golden treatment for preserving enamel integrity and also keeping the natural white aspect of the tooth because in that period the main cause for tooth discolouration was the poor oral hygiene. They also acknowledged that in a larger quantity fluoride becomes harming transforming the enamel in a softer, yellow or brown stained structure [2].

Between 1960s and 1970s carbamide peroxide was used as an oral antiseptic and his bleaching effect was a side effect discovered when treating teeth and conducting studies by Klumsier [3]. In 1977 Falkenstein uses hydrogen peroxide 30% in combination with chlorhydric acid 10% and 100W light for treating tetracycline stained teeth [4].

Dental bleaching became a routine treatment in dental offices in the U.S.A. only after the researches made by Haywood&Heyman in 1989 that introduced bleaching with carbamide peroxide in custom fitted night guards [4].

The new generation of heat sources, like plasma lamps or LED lights, associated with bleaching gel opened the way for new systems like Zoom or "Brite Smile" [3].

TYPES OF DISCOLOURATIONS AND STAINS

The tooth has a variety of colours starting from the cervical area and continuing to the incisal edge [5]. Normally the enamel is transparent and translucent and the colour of the tooth is given mainly by the dentin [6].

The colour of the tooth is influenced by the thickness of the enamel and dentin layers that are in its structure. Progressively as the dentine layer thickness and the enamel layer is getting thinner the colour of the tooth is going to be directed by the dentin. Also any modification of the structure in the enamel, dentin and pulp will influence the way light absorbs and reflects thus modifying the initial colour of the tooth [5].

The light source that is used plays a very important role in the colour perception of the tooth. Usually in the dental office there are 3 sources of light: natural, fluorescent and incandesce. The fluorescent light will have an accent on the blue-green part of the spectrum while the incandesce light will enhance the red-orange part of the light spectrum [5,6].

Discolourations can be divided into 3 main categories: extrinsic, intrinsic and discolouration from other causes. [6,7,8]

Extrinsic discolourations are represented by the aggregation of particles from plaque, mouthwashes with clorhexidine [Fig. 1], food, drinks, tobacco and other external factors to the

enamel surface from the saliva but without being a part in enamel structure. These type of stains can be easily removed with brushing [6,8].

Figure 1. Extrinsic colouration, clorhexidine

Intrinsic discolourations are made possible due to the modification of the structure and thickness of the dentine [Fig. 2] and accumulation of the stain particles inside the enamel and dentin either in the middle of tooth formation or after eruption.

These discolouration can be divided into 2 categories: systemic, which can due to genetical disease (haematological, liver diseases and diseases of enamel and dentine) or medication caused(tetracycline stains, fluorosis stains) and local like: pulp bleeding, root resorption, pulp necrosis, inadequate endodontic treatment. [6,8]

Figure 2. Intrinsic colouration

Discolourations from other causes [Fig. 3] include: teeth ageing, teeth wear and gingival recessions or dental treatments [6].

Figure 3. Discolourations from other causes

Teeth ageing is a physiological process that leads to natural yellowing of the teeth while tooth wear is a progressive process of losing hard structure of enamel and dentin caused by erosion, abrasion and attrition [6].

TYPES OF BLEACHING SYSTEMS

On the market there are professional bleaching systems destined to be used in the dental office with or without light source, bleaching systems for use at home and non professional systems which use substances that don't need prescription [9].

1. Bleaching systems for dental office use, without a light source

The bleaching systems made for dental office use without a light source use as a base substance hydrogen peroxide in high concentration (15-40%). The most used concentration is 35%. To be active these systems don't need application of a light source or heat. [Fig. 4,5]

These commercial systems contain: a product for gingival protection, oral retractor, the bleaching agent, applicator for bleaching gel, product for tooth sensitivity prevention.

The gingival protection is realised by applying gingival barrier which is a light cured resin. This is placed in the cervical area of the tooth slightly overlapping the enamel and gingival embrasure. The gingival barrier is delivered in syringes and is applied with single use tips. At the time of application it has a liquid form that after light curing becomes plastic to adapt on the cervical area of the teeth for a efficient protection.

Oral retractors have the role of protecting the lips, cheeks and the tongue, enlarging the visibility of the tooth surfaces that need to be treated and the most important aspect protecting the oral mucosa from getting in contact with the bleaching substance. The retractors are auxiliary devices that can be made out of polycarbonate which can be sterilised or single use latex. They can have an "O" or "M" or other atypical shapes.

The bleaching substance has a gel form that is mono component or dual component. The two components can be powder-liquid and gel-gel dosed in separate syringes or in dual syringes.

In the case of the bleaching gel the applicator is represented by a disposer tip adapted to the gel's viscosity but also to the systems mono component or dual component. In the case of the powder-liquid systems the product is applied with either a bonding applicator or brush, pellet, etc.

The majority of bleaching systems available today in the market have a product that prevents tooth sensitivity integrated in them. There are specific products that can be used after or before the bleaching treatment to lower the risk of dental sensitivity and creating a greater comfort for the patient.

Figure 4. Initial aspect of the teeth

Figure 5. Aspect after the bleaching procedure

2. Bleaching systems for dental office use, with a light source

The light sources used to enhance the effect of the bleaching agent are: halogen, laser, LED and plasma [10].

Indications for this type of bleaching system include: intrinsic and extrinsic discolourations, enamel or dentin, tooth ageing and light to moderate tetracycline stains.

The advantages of this type of procedure are: time saving, avoidance of the night guard, diminished teeth sensitivity and immediate results. Disadvantages include: greater cost, multiple clinical sessions, dehydration and wrong evaluation of tooth colour, burning effect for the soft tissue and expensive re-treatment compared to the home bleach technique[11].

The main purpose of the bleaching techniques that require a light source is reproducing the aesthetic demands of the patient under the strict control of the thermal variations and without inducing any morphological or chemical alteration to the enamel. A large number of scientific researches certified the clinical superiority of the Argon laser, CO2 and GaAlAs diode when comparing with other light sources that are used for accelerating the dental bleaching procedure [12].

3. Home bleaching systems

The home bleaching technique is an alternative way for treating discoloured vital teeth and can be used separately or combined with a dental office bleaching procedure.

This involves using a lower concentration bleaching agent that is applied on the teeth with the help of a customised night guard. The active substance used is carbamide peroxide

10% or 15%. When in contact with oral fluids the 10% peroxide is split up into water, oxygen and urea which are harmless elements to the human body.

The duration of the treatment exceeds the dental office bleaching procedure because of a lower concentration of the bleaching agent. The optimal results are achieved in 2 to 6 weeks depending on the time of exposure, how often was the treatment performed and the initial teeth discolouration.

Indications for using these type of systems are: teeth with yellow, orange or light brown colour, brown stains caused by fluorosis without white spots, single tooth discolouration, extrinsic coloration caused by coffee, tobacco and tea, whitening adjacent teeth to a fixed prosthesis, chlorhexidine induced discolouration.

Contraindications are: marginal dehiscence of direct restorations, erosive lesions or painful root exposure, chronic smokers, pregnancy and breastfeeding.

The effects of the bleaching agent are the formation of micro spaces and concave areas on the enamel surface. A greater concentration of the bleaching agent (carbamide peroxide more than 35%) may lead to demineralised hard dental structure [2].

The bleaching effects on dental materials are very different. Porcelain and gold restorations are not affected by the bleaching agent while composite restorations may exhibit surface modifications. Amalgam restorations release mercury during the bleaching procedure that corresponds to the safety limits issued by the WHO [2].

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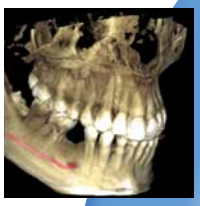

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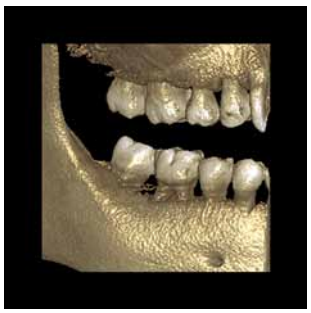

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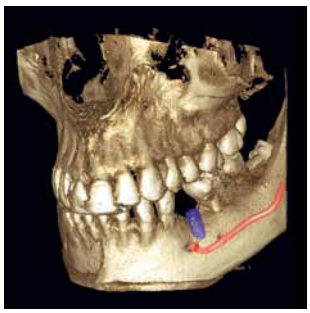

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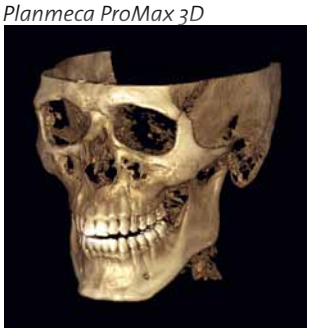

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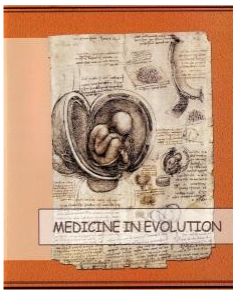

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INTRODUCTION [Book Antiqua, 11, bold, left alignment]

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 referals and do not exhaustively review the subject. Do not include data or conclusions from the paper.

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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.

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

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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;

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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.

- Books - Standard format - #. Author of Part, AA. Title of chapter or part. In: Editor A, Editor B, editors. Title: subtitle of Book. Edition(if not the first). Place of publication: Publisher; Year. p. page numbers.
- Journal Articles - Standard format - #. Author of article AA, Author of article BB, Author of article CC. Title of article. Abbreviated Title of Journal. year; vol(issue):page number(s).
- E-Books - Standard format - #. Author A, Author B. Title of e-book [format]. Place: Publisher; Date of original publication [cited year abbreviated month day]. Available from : Source. URL.
- E-Journals - Standard format - #. Author A, Author B. Title of article. Abbreviated Title of Journal [format]. year [cited year abbreviated month day];vol(no):page numbers[estimated if necessary]. Available from: Database Name (if appropriate). URL.

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, ABREVIATIONS

All measurements must be expressed in International System (IS) units. Abreviations 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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