tions in all subgroups. In subgroup A this index composed 92,89% while the 2-nd examination, 81,36% - while 3-rd examination, 68,06% - while 4-th examination; in subgroup B it is 116,50%, 87,37%, 73,96%; in subgroup C - 84,95%, 80,86%, 77,99% correspondingly.
Reduction of caries increasing in subgroups A and B composed 31,94% and 26,04% correspondingly.

Conclusion

Results of all made examinations proved that offered method of treatment and prophylaxis with laser acupuncture needle is effective for the patients with low and middle level caries intensity while a big period of time (2 years).

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STUDY OF THE PHYSICAL AND MECHANICAL PROPERTIES OF BIOMATERIAL COMPOSITES USED IN MIXED CROWNS

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Introduction

Any mixed crown has to restore the structure of dental arches in order to permit their masticatory, occlusal and esthetics functions. The development of new biomaterial composites allows to create mixed crowns with superior esthetics and resistance than the acrylic crowns [1-4]. These composites use double or triple polymerisation, completed with thermo- and baropolymerisation. The adhesion of composites to metal is based on mechanical macroretentions in the metallic part or on microretention obtained by electrolytic etching or sandblasting. The use of new adhesive techniques and the development of the computer-generated restorations and crowns determine the increase of quality demands for biomaterial composites used in fixed prosthodontics.

Purpose

The purpose of this study is to evaluate physical and mechanical properties such as flexural strength, compressive strength, diametric tensile strength or water absorption (in accordance with ISO 4049-Resin-based filling materials) as well as the metal adhesion of physiognomical component of the mixed crowns.

Materials and methods

The organic phase consists mainly of Bis-GMAn (60%), TEGDMA (30%) and UDMA(10%); Additionally, CQ (0.5%), DMAEM(1%) and BHT polymerisation inhibitor are added. The inorganic phase is based on six vitreous masses (noted G1, G2, G3, G4, G5 and G6) prepared by the conventional melting method. The chemical composition and the synthesis conditions of glass samples are shown in TABLE 1.
The chemical bond between the organic and inorganic phases was provided by silanisation of fillers from an acidulated ethanol-water with 3-methacryloyloxypropyl-1-trimethoxysilane (A-174). The composites were prepared as a paste, by dispersing the synthesized fillers in the organic phase. The hardening of the pasta was performed through exposition to visible light in the range of 400-500 nm, for 40 seconds, using a dental lamp (e.g. 3M).
After the initial hardening, the biocomposite was subdued to a baro-thermic treatment at 135°C temperature and 60 psi pressure, for 20 minutes. The compositions of the light-curing composite resins are shown in TABLE 2.

Results

Characterization biomaterials composites

The values for the mechanical properties determined for the biomaterial composites after light-curing (CM7 sample), respectively after light-curing and baro-thermic treatment (CM1, CM2, CM3, CM4, CM5, CM6 samples) are shown in FIG.1. The tests for the mechanical properties such as compressive strength (CS), diametral tensile strength (DTS) and flexural strength (FS) were performed with an universal mechanical testing instrument, INSTRONE (VEB Thürignger Industrie Werk Rauenstein Company).

Determination of the water absorption.

Water sorption was measured on composite disks (Φ=20,00±0.1 mm; h=1.00±0.05 mm) and stored under distilled water at 37°C for 7 days (FIG.2).

Determination of the composite-metal adhesion through thermal treatment alternative

The test was performed on 50 samples from each composite resin and expressed in per cent values (TABLE 3).

Glasses	Melting regime hx°C	SiO_2	ZrO_2	SrO	ZnO	BaO	Al_2O_3	CaO	Na_2O	CaF_2	B_2O_3	P_2O_5
G1	0x125	30	-	-	15	0.4	30	10	5	9.6	-	-
G2	0x115	43	-	-	5	-	10	11	9	15	-	7
G3	0x140	50	20	-	-	-	10	5	10	5	-	-
G4	0x135	40	-	-	30	-	5	10	5	-	10	-
G5	0x130	40	8	30	-	-	5	12	-	5	-	-
G6	5x125	40	-	-	-	30	10	5	-	5	5	5

TABLE 1. The chemical composition [wt %] and the melting regime (time x temperature) of glasses

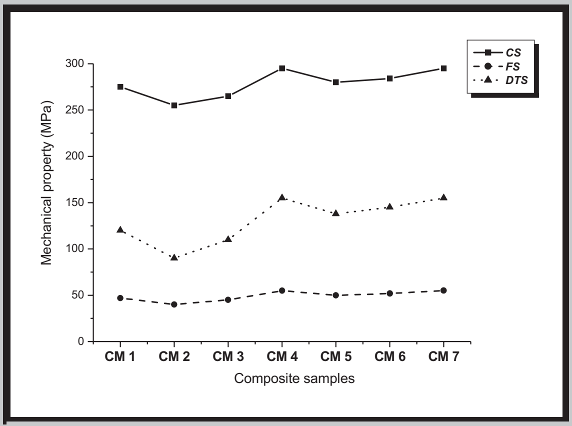

FIG. 1. The compressive strength (CS), diametral tensile strenght (DTS) and flexural strenght (FS) values for the composites samples.

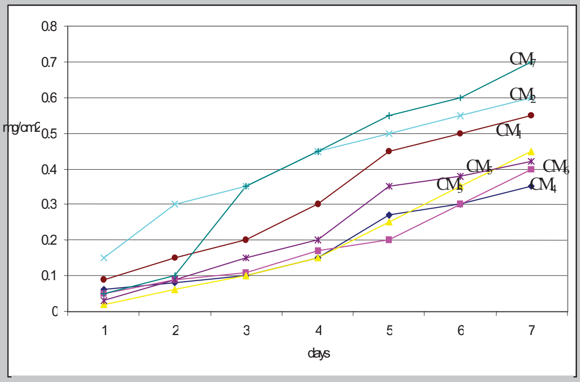

FIG. 2. The water absorption values for composites samples.

Conclusions

The results of the determinations for the physiognomic component of the mixed crowns were analysed in comparison with the control sample, hardened only through photochemical initiation (CM7). The highest mechanical strength values (CS, FS, DTS) were obtained for the baro-thermo-photopolymerized CM4 composite. The water sorption test indirectly illustrates that the interfacial bonds of the organic filler are not damaged; the water sorption values are situated between 0.3 and 0.7 mg/cm^2 for CM4 and CM7 composites. The results of the metal-composite adhesion using Silicoater MD as conditioning system show that the CM4 composite is recommended for the mixed crowns with optimal strenght in time. Taking into consideration the mechanical properties and the water sorption value of the postcured composite CM4, this one was proposed for further investigations such as toxicological and clinical tests in order to be used as physiognomic component of the metallo-polymeric prostheses.

Paste	G1	G2	G3	G4	G5	G6	Quartz
CM1	60						40
CM2		60					40
CM3			60				40
CM4				60			40
CM5					60		40
CM6						60	40
CM7		50					50

TABLE 2. The composition of the inorganic filler for light-curing composite resins [wt%].

Conditioning system	Composites						
	CM1	CM2	CM3	CM4	CM5	CM6	CM7
Silicoater MD	20 %	18 %	10 %	0 %	10 %	14 %	40 %

TABLE 3. Adhesion through thermal treatment alternative.

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BIOMATERILAS BASED ON POLYSILOXANES AND GLASS FIBERS

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Introduction

The aim of our study is to design and to produce biomaterial with mechanical and biocompatibile properties that should approach as much as possible the properties of the human bone, the strength characteristics should be at least the same and the modulus of elasticity should be close to the value characterizing the human bone. It should have a sufficient porosity, to enhance a bone growth. However, by the biocompatibility is meant now not only a passive biocompatibility or an inertness that is the facilitation of the growth of the tissue around the implant without any signs of toxicity but especially the bioactivity, i. e. the assurance of a