SSPD

Scandinavian Society for Prosthetic Dentistry

50 years anniversary

50 years of digital dentistry

18-20th August 2022
Aarhus, Denmark

Content

Dear colleagues,

It is a pleasure to warmly welcome you to the 50th annual SSPD meeting in Aarhus, Denmark.

It has been 10 years since the last SSPD meeting was held in Aarhus. Digital dentistry has since revolutionized the diagnosis, planning, and treatment in dentistry. The 50 years anniversary of SSPD meeting in 2022 coincides with 50 years of digital dentistry history. During this scientific meeting, the invited world-class speakers will present the latest updates on both tooth- and implant-supported prosthodontic rehabilitation using conventional and digital technology.

We look forward to welcoming you again to beautiful Aarhus city (www.visitaarhus.com) and hope that you will enjoy both the scientific and the social program and interactions with Scandinavian and international prosthodontists.

Last but not least, we would like to thank our sponsors for making this meeting possible.

Best regards

Golnoush Bahrami and Bahram Ranjkesh

Scientific program

Thursday 18 August

16:00 – 18:30	Registration at Comwell Hotel
19:00 – 20:30	Reception at Aarhus City Hall

Friday 19 August

08:00 – 09:00	Registration, coffee, and exhibition
09:00 – 09:15	Opening ceremony
09:15 – 10:15	Prof. Francois Duret: The twenty first dental CAD/CAM years (1970-1990)
10:15 – 10:45	Coffee and exhibition
10:45 – 12:00	Prof. Irena Sailer / MDT Vincent Fehmer: Prosthodontics in time of digitalization I
12:00 – 13:00	Lunch, coffee, and exhibition
13:00 – 14:00	Prof. Irena Sailer / MDT Vincent Fehmer: Prosthodontics in time of digitalization II
14:00 – 14:30	Coffee and exhibition
14:30 – 15:30	Prof. Per Vult von Steyern: Updates on dental ceramics
15:30 – 16:30	Poster session/competition
17:15	Bus to Tivoli Friheden from Comwell Hotel
18:00	Conference dinner at Herman's restaurant
00:15	Bus to Comwell Hotel from Tivoli Friheden

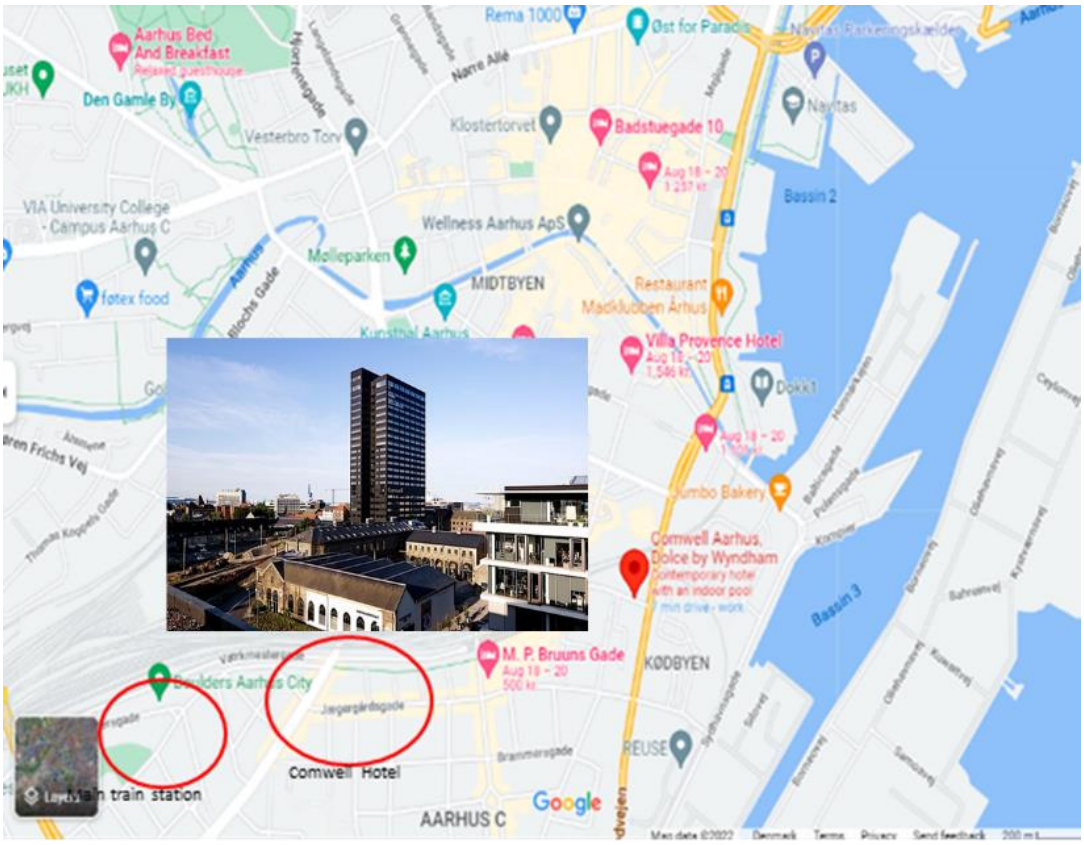
Saturday 20 August

08:00 – 09:00	General assembly / coffee and exhibition
09:00 – 10:00	Dirk Leonhardt / Bahram Ranjkesh: 3D printing: techniques and materials
10:00 – 11:00	Rubens Spin Neto: CBCT and digital planning of implant surgery
11:00 – 11:30	Coffee and exhibition
11:30 – 12:30	Klaus Gotfredsen: Implant-supported rehabilitation
12:30 – 12:45	Goodbye
12:45 – 13:30	Lunch (to go)

Conference venue

Comwell Aarhus *(Værkmestergade 2, 8000 Aarhus C)*

The venue is centrally located and is close to Aarhus harbor and is easy accessible by sea, road or train.

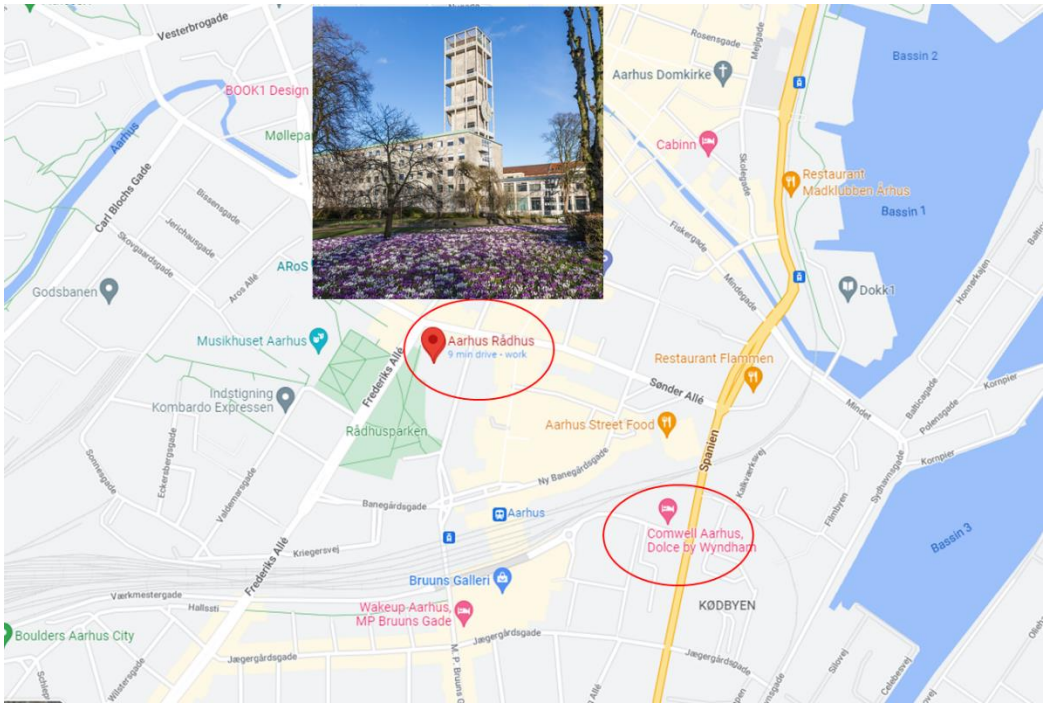


Read more: https://comwell.com/hoteller/comwell-hotel-aarhus

Network name and password: comwelhotels

Social events

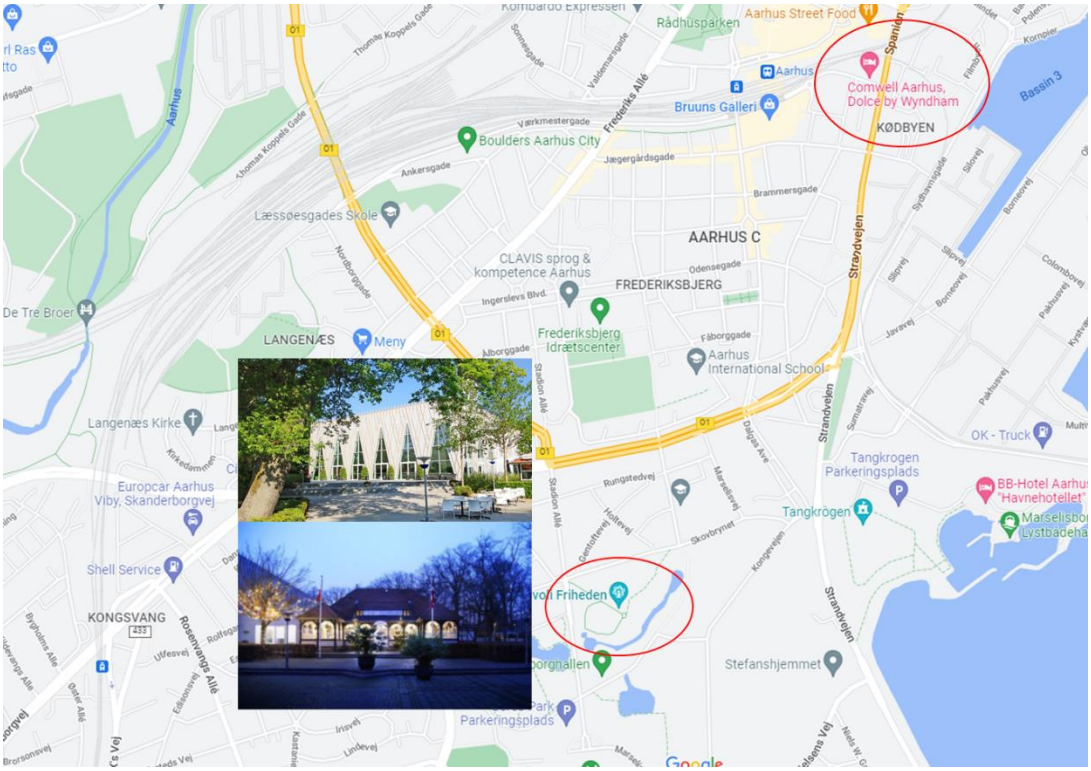
- Welcome reception at Aarhus City Hall (Aarhus Rådhus)
  Aarhus Rådhus, Sønder Allé 2, 8000
  Aarhus Thursday 18 August, 19:00 to 20:30



Read more: https://www.aarhus.dk/om-kommunen/aarhus-raadhus/historien-om-aarhus-raadhus/

- Conference dinner at Herman's restaurant (Tivoli Friheden) and concert at Tivoli gardens (Fed Fredag 2022: Christopher - 19/08 (friheden.dk)
  Friday 19 August, 18:00 to 00:15

A bus transfer will be available
from the conference venue to Tivoli Friheden at **17:15**
and will return to the conference venue at **00:15**



Read more: https://friheden.dk/hermans/

Insurance and liability

Neither the organizers, nor the Concert Hall take any responsibility for injury or damage involving persons or property during the conference. Participants are advised to take their own health and travel insurance.

Abstracts

Abstracts appear in the alphabetical order of the titles.

Accuracy comparison of different implant impression techniques: digital versus conventional

Ghahramanloo A[1], Seifi M[2], Nakhaei M[3], Sabzevari S[4], Nemati-Karimooy A[5*]

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2) Department of Restorative and Cosmetic Dentistry, Mashhad university of Medical Sciences, Mashhad, Iran

Objective: The purpose of this study was to compare the accuracy of two different conventional implant impression techniques (pick-up and transfer) and the new method using digital oral scanner (TRIOS, 3shape, Denmark).

Material and methods: Nine implants (B2 Ø 4.1/14mm; Dentaswiss, Biodenta Swiss AG, Tramstrasse 16, CH-9442 Berneck, Switzerland) were inserted in three acrylic models of edentulous lower jaw. Fixtures implanted with different angles (0°, 15°and 25°) in each model using milling machine. Three different impressions (A, pick-up; B, splinted pick-up; C, oral scan) were taken from each model. Five stone casts for each model in groups A and B were produced. For group C the STL (Standard tessellation language) files were obtained from the oral scanner (TRIOS, 3shape, Denmark). Using lab scanner and scan bodies on master models, reference files were produced in order to compare the STL files of the casts and the oral scanner. Scan bodies were mounted on the lab analogues to digitalize the casts. The tests and references data superimposed and the deviations of the three scan bodies were measured three-dimensionally (GeoMagic Control X® by 3D systems Inc.2016, Rock Hill, SC, USA). The data were analysed using ANOVA analysis.

Results: The mean of 3D deviation in splinted and non-splinted groups were 61.84±15.84 µm and 57.90±12.65 µm respectively. The difference between these two groups were statistically insignificant ($p=0.535$). Comparing the angulation between implants in groups A and B, the data were statistically insignificant ($p=0.401$). The deviations in digital groups were statistically significant comparing both splinted and non-splinted groups ($p<0.001$) in all three angulations.

Conclusion: Within the limitations of this in vitro study, there is no difference between accuracy of splinted and non-splinted implant impression techniques. Also the implant angulation up to 25°did not affect the accuracy of implant impressions in both splinted and non-splinted implant impression techniques. It was showed that digital implant impression technique using intra oral scanner showed less accuracy than conventional implant impressions in edentulous jaws.

Clinical outcome of three different types of posterior all-ceramic crowns. A 3-year follow-up of a multicenter, randomized, controlled clinical trial.

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2) Department of Materials Science and Technology, Faculty of Odontology, Malmö University, Malmö, Sweden.

Objective: To assess and compare the clinical outcome of three different types of all-ceramic posterior tooth-supported crowns.

Materials and methods: Seventy-one patients received 90 all-ceramic crowns randomized to be either high translucent zirconia (ZC), high translucent zirconia with a partial buccal veneer (ZC-V) or lithium-disilicate glass-ceramic (LDS). All treatments were performed by four general dentists. Choice of material was blinded. Baseline and subsequent annual evaluation was based on modified California Dental Association (CDA) criteria. A questionnaire was used to include patient-reported outcomes and compare them to the crown quality rating performed by dentists.

Results: A total of 66 patients with 84 crowns were examined after 3-years. The survival rate was 98.8%. No crowns fractured during the observation period. One ZC-V crown failed due to loss of retention and three complications were noted: loss of retention occurred at 1 ZC crown and 2 ZC crowns were endodontically treated. There was no significant difference between the different crowns regarding margin integrity, surface, or anatomic form. Both patients and examining dentists rated the crowns favorably, patients more than dentists regarding the esthetics.

Conclusions: Posterior lithium-disilicate glass-ceramic crowns and translucent zirconia crowns with or without a partial buccal veneer show excellent and promising clinical outcome in a short-term perspective. Patients and dentists rate the restorations favorably concerning esthetics and function.

Digital versus analog prosthetic workflow for students constructing implant-supported single crowns. A randomized crossover study.

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3) Section of Oral Rehabilitation, Department of Odontology, Faculty of Health Sciences, University of Copenhagen, Copenhagen, Denmark.

Background: *Implant-supported single crowns* (ISSC's) are a wide-spread and viable treatment modality for partially edentulous patients. There are, however, *two different prosthetic workflow* techniques for construction of these, an *analog*, and a *digital*. Digital impressions are gaining ground and have been claimed to be more comfortable for patients and equally or more accurate than analog impressions. Evidence regarding this is though sparse, especially concerning inexperienced dental students.

Objective: The purpose of this randomized, crossover study was to examine and compare the digital and the analog workflow in the dental clinic for ISSC's evaluated by both the patients and the students and to assess the quality of the final restorations.

Material and methods: The study was designed as a *randomized, cross-over investigation* with two commonly used impression techniques: a *digital intraoral scanning (IOS)* and an *analog impression* using polyether impression material. Forty patients in need of a single tooth replacement were included. Three months after initial implant placement, impressions were taken, where the patients were randomized into two groups (analog or digital) but had to undergo both procedures (cross-over). Only the designated impression was sent to the laboratory to be processed. All patients and students were asked questions regarding the impression techniques and about which impression technique they preferred with the help of *Visual Analog Scale* (VAS 0-100), and the patients had to fill out an *Oral Health Impact Profile* (OHIP-14) questionnaire before and after treatment. The restorations were evaluated according to the *Copenhagen Index Score* (CIS).

Results: Patients highly preferred the digital technique (80%) over the analog technique (2%), while 18% had no preference. The patients were bothered significantly more ($P < .001$), experienced significantly more shortness of breath ($P < .001$) and anxiousness during the analog impression than during the digital impression ($P < .001$). The students also preferred IOS (65%) over the analog technique (22%) and 13% had no preference. The students assessed that the analog impression procedure was less time consuming ($P > .05$) but was perceived as more uncertain in comparison to IOS ($P > .05$). IOS was however perceived as significantly more unpractical than the analog technique ($P < .05$). The results from CIS show that there was no major difference in the aesthetic assessment and the need for interproximal and occlusal adjustment was the same for both the techniques. The OHIP-14

scores show a significant general drop in the scores, that indicates less problems after treatment ($P < .001$).

Conclusion and clinical implication: This study shows that most of the patients and students highly preferred the digital technique over the analog technique. The aesthetic or technical outcome did not differ significantly between the two techniques. The OHIP-score decreased significantly after treatment in both workflows. This project has great clinical relevance, as it shows the advantages and disadvantages of the two impression techniques, when handled by inexperienced dentists. No current in vivo study has examined these factors.

Effect of Post-curing at Nitrogen Gas on Mechanical Properties of Water-stored 3D-printed Soft Occlusal Splint

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1) Department of Biomaterials Science and Turku Clinical Biomaterials Centre - TCBC, Institute of Dentistry, University of Turku, Turku, Finland
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Objective: To evaluate the effect of post-curing at nitrogen gas on the mechanical properties of water-stored 3D-printed soft occlusal splints. The investigated mechanical properties were flexural strength, flexural modulus, fracture toughness, and Vickers hardness.

Materials and methods: Forty bar-shaped specimens (KeySplint Soft, Keystone Industries) were 3D-printed and water-stored at 100°C for 16 hours. Half of them were printed by a liquid crystal display (LCD) printer with 405nm (Creo™ C5, PLANMECA) (Creo group), while the other half were printed by a digital light processing (DLP) printer with 385nm (Asiga MAX™, SCHEU-DENTAL) (Asiga group). Each group was divided into two subgroups according to the post-curing condition: stroboscopic post-curing with 2000 flashes on each surface (Otoflash G171, BEGO) at nitrogen gas and stroboscopic post-curing with 2000 flashes on each surface in air atmosphere. Flexural strength and flexural modulus were evaluated (n=10/subgroup). Specimens were selected from each subgroup for the evaluation of Vickers hardness. Thirty-two additional specimens were prepared for the evaluation of fracture toughness (n=8/subgroup). Data were statistically analyzed with ANOVA and Tukey post-hoc analysis (α= 0.05).

Results: 1-way ANOVA revealed a significant difference among the tested groups/subgroups on the investigated mechanical properties ($P < 0.01$). In Creo and Asiga groups, specimens post-cured at nitrogen gas showed significantly higher Vickers hardness than those in air atmosphere ($P < 0.001$). In Asiga group, specimens post-cured at nitrogen gas showed significantly higher flexural strength and modulus than those in air atmosphere ($P < 0.001$), while no significant difference in those mechanical properties among subgroups in Creo group. 2-way ANOVA showed that the post-curing condition significantly affected flexural strength, flexural modulus, and Vickers hardness ($P < 0.05$).

Conclusions: The post-curing at nitrogen gas can enhance the mechanical properties of water-stored 3D-printed soft occlusal splints. Additionally, the type of 3D printer can affect their mechanical properties.

Marginal bone level around single tooth implants after more than five years of function. A retrospective, radiological, cohort study.

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Objective: To determine the impact of the distance from the implant to adjacent teeth (horizontal) and of the implant placement level (vertical) on the radiographic marginal bone loss (MBL) following implant placement.

Material and methods: Patients treated with implant-supported single-crowns in the Regional Dental Care from 2005 to 2017, were potentially eligible. Inclusion criteria were patient's age ≥18 years, absence of systemic disease affecting bone metabolism, periapical radiographic documentation available from baseline and after a minimum of 5 years of function. The marginal bone level around the implants were measured using dedicated software and served to calculate the MBL (i.e., radiographic bone level at 5 years minus radiographic bone level at the baseline). Two parameters were investigated in relation to MBL: the implant's distance to neighboring teeth (≤1.5 mm/>1.5mm); and the apico-coronal implant placement level (≤3 mm/>3mm from the CEJ of adjacent teeth). Student's t-tests were used to compare MBL for each of the assessed parameters.

Results: A total of 297 implants were included. The mean MBL at 5 years was 0.20 ± 1.29 mm on the mesial aspect and 0.15 ± 1.09 mm on the distal aspect. The implant's distance to neighboring teeth being ≤1.5 mm compared to sites >1.5 mm did not significantly influence MBL, at the mesial (p=0.742) or distal (p=0.890) implant aspects. As for the vertical implant placement level, no differences were found comparing those placed at ≤3 mm from the CEJ of the neighboring teeth, compared to those placed at >3mm (p=0.690, mesial aspect, and p=0.889, distal aspect).

Conclusion: Within the limitations of the present study, the distance from the implant to adjacent teeth, and the vertical implant placement level did not have a significant impact on the radiographic MBL assessed at least 5 years after implant placement.

Survival and success of dental implants in patients with autoimmune diseases: a systematic review

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3) Section of Oral Pathology and Medicine, Department of Odontology, University of Copenhagen, Copenhagen Denmark

Objective: The objective of this systematic review was to elucidate the impact of autoimmune diseases and their medical treatment on dental implant survival and success based on the available literature.

Materials and methods: An electronic search was conducted in PubMed/MEDLINE, EMBASE, and Cochrane Library to identify articles published in English until November 2021. An additional manual search was performed using reference lists of identified articles. Any clinical study on patients with autoimmune disease in whom implant therapy was performed was potentially eligible. The following were extracted: Study information, patient demographics, type of autoimmune disease, medical treatment, implant treatment characteristics, biological outcome, technical complications, and patient-reported outcome. The survival and success rate of dental implants and suprastructures at patient and implant level was calculated for each autoimmune disease and medication.

Results: Initially, 4840 articles were identified, 3510 titles were found after removal of duplicates, 475 abstracts were evaluated and thereafter 158 full-text articles. Additionally, 25 articles were retrieved through manual search. A total of 72 articles could be included. The included studies mainly comprised case reports and retrospective studies and few prospective controlled studies. In general, the survival rates of dental implants were reported to be high irrespective of the type of autoimmune disease and medication. A limited number of studies presented data on implant success.

Conclusions: The present systematic review indicates that dental implants placed in patients with autoimmune diseases and patients on immunosuppressants in general are characterized by a high survival rate. However, the level of evidence is low. Therefore, systematic long-term documentation of implant therapy in patients with autoimmune diseases are encouraged.

The localization subgingival margins of cavity: a new classification

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1) Department of Prosthetic Dentistry, Ivano-Frankivsk National Medical University, Ivano-Frankivsk, Ukraine
2) Dentistry PE department, Ivano-Frankivsk National Medical University, Ivano-Frankivsk, Ukraine

Objective: Restoring large defects with proximal caries extending below the cemento-enamel junction and cavity margins located beneath the gingival tissues represents a very common clinical situation. The aim of this article is to propose a clinical classification of the localization subgingival margins of cavity.

Material and methods: Diagnosis is carried out by periodontal probe perpendicular to the long axis of the tooth in the deepest point of the cavity's margin. To describe the localization subgingival margins of cavity we use exponent which value is equal to the distance (integer number expressed in millimeters) of the level of epithelial attachment to the margin of the cavity. If the cavity's margin is located over gum - we put the sign "+" before exponent. If the cavity's margin is under gum we put the sign "-". If the cavity's margin is located at the level of epithelial attachment we inscribe exponent "0". The defect of hard tissue denoted "C" (For example: 2-1 class by Black - cavity's margin is 1 mm below the level of the epithelial attachment, although it can be used with the other, such as: M-1OD+1 and others.). Three periodontal examiners, with >10 years of periodontal practice, were required to attend a calibration session aimed at the validation of the proposed classification.

Results: The intrarater and interrater agreement among the localization subgingival margins of cavity: for intrarater agreement ranged from 0.74 to 0.95 (almost perfect agreement), whereas interrater agreement ranged from 0.26 to 0.59 (moderate agreement).

Conclusions: The classification the localization subgingival margins of cavity is useful for reaching a more precise diagnosis.