

To
The Chair of the Scientific jury
According to Order № P - 102/25.01.2022
Of the Rector of MU-Plovdiv
Bul. Vasil Aprilov 15A, 4002 Plovdiv

According to Art.30 of the regulations for application of the Law for development of the academic staff in the Republic of Bulgaria in accordance with procedure for awarding educational and scientific degree "Doctor" to Dr. Lilyana Hristova Shtereva self-training doctoral student in Department "Pediatric dentistry", Faculty of Dental Medicine, Medical University of Plovdiv, after preliminary discussion by the extended Department Council (ex. № 142 / 04.11.2022) and acceptance by the Faculty Council (ex. № 9 / 09.12.2021) of the Faculty of Dental Medicine of the developed dissertation on the topic: **"Diagnostics and control of silanization of first permanent molars"** with academic supervisor Assoc. Prof. Dr. Veselina Kondeva-Glavinkova, PhD

Attached I present: Review

In regard with the procedure awarding "Doctoral degree"

Of **Dr. Lilyana Hristova Shtereva**, self-training PhD student at the department of Pediatric Dentistry, FDM, MU-Plovdiv

Prepared the review:

Prof. Dr. Ani Bozhidarova Belcheva, PhD

Faculty of Dental Medicine-Plovdiv, MU-Plovdiv

Scientific specialty- Pediatric Dentistry

Faculty of Dental Medicine-Plovdiv

Department of Pediatric Dentistry

Address and contacts:

Postal address: Plovdiv - 4002

Bul. "Hristo Botev" №3

Faculty of Dental Medicine - Plovdiv

Department of Pediatric Dentistry

Email: ani.belcheva@mu-plovdiv.bg

GSM: 0889 52 89 32

REVIEW

By Prof. Dr. Ani Bozhidarova Belcheva - Krivorova, PhD

Head of Department "Pediatric dentistry" FDM, MU- Plovdiv

Member of the scientific jury included by order of the Rector of MU-Plovdiv

№ P - 102/25.01.2022

In accordance with: Procedure for awarding educational and scientific degree "Doctor" in doctoral program "Pediatric dentistry" of Dr. Lilyana Hristova Shtereva, self-training doctoral student at the department of Pediatric Dentistry, FDM, MU-Plovdiv for the development of dissertation on the theme: "Diagnosticis and control of silanization of first permanent molars" with academic supervisor Assoc. Prof. Dr. Veselina Kondeva-Glavinkova, PhD, in professional field 7.2. "Dental Medicine", sphere of higher education 7. Health and sports.

The presented set of materials on paper and electronic media is in accordance with the Law on the Development of Academic Staff in the Republic of Bulgaria and Art. 70(1) of the Procedure for awarding "doctoral degree" in MU - Plovdiv; Regulations for Academic development of MU-Plovdiv.

I. Biographical data and professional development.

Dr. Lilyana Hristova Shtereva was born in 1991 in the city of Plovdiv. She completed her secondary education in 2010 at ELS "Plovdiv" in Plovdiv. She graduated from FDM, MU-Plovdiv in 2016, and in 2017 with a competition she was appointed as a full-time assistant in the Department of Pediatric Dentistry, FDM, MU-Plovdiv, where she still works today.

Dr. Shtereva conducts exercises for students from second to fifth year, in Bulgarian and English language. She is a specializing in Pediatric Dentistry.

She is fluent in written and spoken English language.

Dr. Shtereva is a member of BDA, BSSDM, NAPD.

II. Structure of the dissertation

The dissertation presented to me for review is written on 165 pages, of which 42 pages are an overview, 9 pages - material and methods, 75 results and discussion. It is illustrated with 11 figures and 1 table. 259 literature sources were used, of which 6 in Cyrillic and 253 in Latin.

The dissertation is properly structured, contains all the basic elements for presenting a dissertation: introduction, literature review, purpose and tasks, material and methods, results and discussion, summary, main conclusions, bibliography and applications.

III. Significance of the theme

The application of a prophylactic material on the pits and fissures of the masticatory teeth - sealants aims to prevent the appearance and development of carious lesions on the occlusal

surfaces. Due to the need for prevention of carious lesions of the pits and fissures, various preventive measures have been taken over the years. The main purpose of prophylactic silanization is to prevent the occurrence of occlusal carious lesions during primary prevention. Nowadays, some authors recommend silanization for secondary prevention. Such are the cases in which there is an initial carious lesion in the enamel, which, however, does not cross the enamel-dentin border.

By preventing occlusal carious lesions, the development of up to 90% of carious process can be reduced. If the application of sealant takes place immediately after the tooth eruption, the retention of the deep fissures can be removed. Diagnosis of the occlusal tooth surface is one of the objects of scientific interest in dentistry. A number of diagnostic methods and tools have been developed, the main purpose of which is more accurate diagnosis. Each method of diagnosis has both positive and negative aspects, established in science and confirmed in practice.

The low cost and speed of implementation of some visual-tactile methods determines their more widespread use. High-tech methods, on the other hand, are expensive, require special equipment and are used mainly in research. The effectiveness of sealants is directly related to their retention on tooth surfaces. It is also related to the insulation of the work area, the choice of material, its physical and chemical characteristics, the methods of application of materials and methods of polymerization. Since their introduction until now, sealants have been highly recommended by dentists as a preventive measure against the development of occlusal carious lesions, especially in individuals at high risk of caries.

The topic is relevant, socially significant and concerns the possibilities for preventing the development of such a widespread disease as dental caries.

IV. Knowledge of the problem by the doctoral candidate

Dr. Shtereva demonstrates knowledge of the scientific literature on this issue. With a short introduction, the dissertation presents the essence of this topical issue of pediatric dentistry.

The literature review is written in a volume of 41 pages. It is informative and, despite numerous repetitions, provides knowledge from historical data to more modern methods and tools. The scientific literature on the types of sealants, silanization methods, as well as indications, contraindications in childhood and the relationship with the risk of developing carious lesions is analyzed. The methods for diagnosing dental caries are also discussed in detail.

The review does not summarize or address unresolved issues. The main motivation for the chosen topic of the dissertation is seen in the lack of modern research and at the same time omitted sources of research in our country that are relevant to the problem.

I appreciate the literature review as informative and to some extent repetitive of the material taught at the student level.

V. Research methodology

The aim of the present dissertation is clearly formulated: to study the diagnostic possibilities of visual and fluorescent diagnostics, caries-prophylactic effect and retention of sealants in the newly erupted first permanent molars and in occlusion.

It is realized through six set tasks, with two subtasks on the first and fifth tasks, three subtasks on the second task and four subtasks on the third and fourth tasks, which are performed sequentially, some have clinical application.

The tasks set for the implementation are: to select patients according to the risk of developing oral diseases with newly erupted first permanent molars and occlusion; to silanize by indications and to control silanization by visual and fluorescent methods for diagnosis of the 3rd, 6th and 12th month by frequency analysis of data for the group of 7-8 year olds and 5-6 year olds; to monitor the caries-prophylactic effect of sealants by visual and fluorescent methods for diagnosis of the 3rd, 6th and 12th month by frequency analysis of data depending on the absence or presence of carious lesions for the group and on the jaws of 7-8 years old and 5-6 year olds; to monitor the retention of sealants by visual methods for diagnosis of the 3rd, 6th and 12th month by frequency analysis of data depending on the retention of the sealant for the jaw group of 7-8 year olds and 5-6 year-olds; to evaluate the applied visual and fluorescent methods for diagnosis of occlusal carious lesions and control of silanization by ROC-analysis of data for the group of 7-8 year olds and 5-6 year olds; to make recommendations for the use of sealants according to the risk and condition of the eruption. All tasks help the dissertant to successfully achieve the goal.

Clinical and statistical methods were used for the conducted researches, where opportunities for scientific potential and scientific thinking of the dissertation are seen. The methodologies are well described. Numerous statistical methods have been used to objectify the results of the analyzes. The statistical methods described in the last version of the dissertation are adequately used. The data processing was performed using a specialized software product IBM SPSS, version 25.0 and MS Excel 2019.

VI. Characteristics and evaluation of the scientific work and contributions

The dissertation is a personal work of the doctoral student and its structure is in accordance with modern requirements and contains all necessary sections: introduction, literature review, purpose and tasks, material and methods, results and discussion of individual tasks, conclusions, contributions and bibliography.

An essential part of Dr. Shtereva's dissertation is the results and their discussion. The obtained results are well illustrated and are directly related to the solved tasks. They are presented only with diagrams, properly structured, but without clarity about the distribution and reflection of the primary database in tables or applications.

Each task ends with conclusions, which helps to better perceive the results.

With the obtained results and their analysis Dr. Lilyana Shtereva has achieved the set goals and objectives of her dissertation. The results of the doctoral student's own research are presented

in detail. In the discussion there is a comparative analysis of own results with the data published in the scientific literature.

The conclusions made on each of the tasks reflect in a synthesized form the results of the study:

Firs task - It is found that there is no statistically significant difference between the average values of the OHI index of the two groups of children aged 5-6 and 7-8 years. There was no statistically significant difference between the mean values of the DFMT + dft index in the two groups of children. There is a linear relationship between OHI and DMFT + dft in both groups.

Second task - It is stated that the applied visual and fluorescent methods (ICDAS II; VistaCamiX Macro according to ICDAS II; VistaProof) are suitable for diagnostics of occlusal surfaces and determination of indications for application of resinous sealants (Fissurit F, VOCO) and glass -ionomer cements used for silanization (Fuji Triage, GC). The application of ICDAS II, VistaCamiX Macro according to ICDAS II, VistaProof and the modified Ryge criteria are suitable for control of silanization with resin-based sealants (Fissurit F, VOCO). ICDAS II, VistaCamiX Macro according to ICDAS II and the modified Ryge criteria are suitable for control of silanization with glass-ionomer cements used for silanization (Fuji Triage Pink, GC).

To control silanization with Fuji Triage Pink, GC, it is not appropriate to apply VistaProof, which, due to the composition of the cement, leads to false positive results. In the follow-up period of both sealants, it was found that even with partial or complete loss, the tooth surface remains healthy in the majority of cases.

All diagnostic methods used to control silanization prove a low relative share of surfaces with partially or completely dropped sealant that are affected by caries.

Third task - It is stated that the study of the caries-prophylactic effect of the 3rd month, through visual diagnostics and modified Ryge criteria shows 100% healthy tooth surfaces in total and in the jaws, as in the composite-based sealant (Fissurit F, VOCO), as well as in glass ionomer cement (Fuji Triage, GC).

Diagnosis with VistaCamiX Macro and Vistaproof at 3, 6 and 12 months showed less caries-prophylactic effect in general and by jaw type compared to visual diagnosis and Ryge criteria for resin-based sealant (Fissurit F, VOCO).

Diagnosis with Vistaproof shows the lowest caries-prophylactic effect of resin-based sealant (Fissurit F, VOCO), compared to other diagnostic methods in general and by type of jaws in all control examinations.

Diagnosis with VistaCam Macro shows approximately equal caries prophylactic effect of glass ionomer cement used for silanization (Fuji Triage Pink, GC) in general and in the upper jaw and less caries prophylactic effect in the lower jaw compared to data obtained from visual diagnostics and modified Ryge criteria for all inspections.

The fourth task states that the retention of resin-based sealant (Fissurit F, VOCO) is significantly better than the retention of glass-ionomer cement used for silanization (Fuji Triage Pink, GC) in all inspections during the follow-up period. No significant difference was found between the loss of sealant in maxillary and mandibular occlusal surfaces, but to a greater extent the loss of sealant was observed in maxillary molars.

Fifth task - in the control of silanization with Fissurit F no significant difference is found between the applied diagnostic methods. Diagnosis with the VistaCam Macro magnifying camera has the best comparability with the gold standard and about 90% reliability of the method in the control of silanization with Fissurit F.

VistaProof shows high sensitivity but lower reliability, about 70% compared to VistaCam Macro, which is why it is considered an excellent auxiliary diagnostic method to control silanization with Fissurit F. The control of silanization with Fuji Triage Pink at month 3 showed a match between the results obtained with visual diagnostics on the ICDAS II system, VistaCam Macro and Ryge criteria. The control of silanization with Fuji Triage Pink reveals an excellent combination of sensitivity and specificity in the use of VistaCam Macro and visual diagnostics on the ICDAS II system. The magnified images obtained using VistaCam Macro improve the ability to observe the field and allow for more precise planning of subsequent treatment.

The following recommendations for the application of sealants have been made **for task six**:

- At risk of developing occlusal caries are the first permanent molars of children at high risk of developing oral diseases, which must be silanized as a priority;
- The main diagnostic method with optimal reliability and detailed informativeness is the visual diagnostics according to the ICDAS II system;
- VistaProof FC and Ryge modified criteria are excellent diagnostic aids. VistaProof FC performs satisfactorily in assessing the condition of occlusal surfaces, but shows a tendency to overdiagnosis, which can lead to unnecessary treatment;
- Perfect addition and almost 100% reliability and comparability with the visual diagnostics of the ICDAS II system, is observed when using the magnifying camera of VistaCamiX Macro;
- Resin-based sealants are suitable for silanization of occlusal surfaces of teeth, when the achievement of adequate insulation of the working field is possible. They provide both an excellent caries-prophylactic effect and very good retention. Resin-based sealants are suitable for silanization of completely pierced first permanent molars entering occlusion;
- Glass ionomer cements used for silanization are the main tool of choice when it is impossible to control moisture. Such are the cases in which the first permanent molars have not completely erupted and have not entered occlusion. Despite their significantly lower retention, they provide excellent caries-prophylactic effect due to the significantly longer release of fluoride ions and the possibility of recharging the sealant.

The dissertation ends with the following main Conclusions, which arise from the set goals and tasks:

1. Silanization of occlusal surfaces is an effective method for prevention of dental caries in children at high risk of developing dental caries.
2. Accurate diagnosis is crucial for the choice of prophylactic agent.

3. The applied visual and fluorescent methods ICDAS II, VistaCamiX Macro according to ICDAS II and VistaProof are suitable for diagnostics of occlusal surfaces and determination of indications for application of resin-based sealants and glass ionomer cements used for silanization.
4. Diagnosis of occlusal surfaces at magnification using VistaCamiX Macro shows the greatest comparability with visual diagnostics on the ICDAS II system.
5. Visual diagnostics according to the ICDAS II system, diagnostics with VistaCamiX Macro according to ICDAS II, VistaProof and the modified Ryge criteria are suitable for control of silanization with resinous sealants.
6. ICDAS II visual diagnostics, VistaCamiX Macro diagnostics according to ICDAS II and modified Ryge criteria are suitable for the control of silanization with glass-ionomer cements used for silanization.
7. To control silanization with Fuji Triage Pink, GC is not appropriate to apply VistaProof FC, which due to the composition of the sealant, leads to false positive results.
8. Visual diagnostics according to the ICDASII system and diagnostics under magnification with the help of VistaCamiX Macro according to the ICDAS II system have the greatest diagnostic reliability.
9. VistaProof FC and modified Ryge criteria are good diagnostic aids.
10. Resin-based sealants are suitable for silanization of occlusal surfaces of teeth, when adequate insulation of the working field is possible. They provide both an excellent caries-prophylactic effect and very good retention.
11. Glass-ionomer cements used for silanization are the main means of choice in case of inability to control moisture, as is the case with newly drilled molars. Despite their significantly lower retentiveness, they provide excellent caries-prophylactic effect.
12. The resin-based sealants and glass-ionomer cements used for silanization show a similar caries-prophylactic effect in the studied age groups.

As Contribution of original character for our country I accept:

- One-year follow-up of silanized tooth surfaces of the first permanent molars of children aged 5-8 years using VistaCam-Macro and Proof FC

A lot of confirmatory studies have been done:

- The excellent caries-prophylactic effect of glass-ionomer cement used for silanization in newly erupted first permanent molars and its lower retention was studied.
- The excellent caries-prophylactic effect of resin-based sealant in the first permanent molars in occlusion and its excellent retention were studied.
- The need for silanization of the first permanent molars of children in the high-risk group has been studied.
- The excellent comparability between visual diagnostics with and without magnification according to the ICDAS II system was studied.

- The use of Vista Proof FC has been shown to be unsuccessful in tracking occlusal surfaces silanized with Fuji Triage Pink due to its overdiagnosis.

This dissertation contributes to the popularization of research related to the possibilities of prevention through sealants in childhood.

VII. Evaluation of the publications and personal contribution of the doctoral student

The list of scientific publications in connection with the dissertation includes 3 real publications in which Dr. Lilyana Shtereva is a leading author. She also has 6 participations in Bulgarian and international forums, where she is also a leading author. My observations indicate that the research is the personal work of the doctoral student. She is diligent and has the potential to realize theoretical and clinical statements.

VIII. Critical remarks

Much improved final version. The doctoral student has complied with many of the recommendations. I have some other notes on the work and its presentation. The literary review should be critical and analytically present the information from the scientific literature. In some places in the review there are passages with text without quoting the author. There are other spelling and technical errors. Concepts are used that are quite different from those generally accepted in the literature - it is more correct to use "Resin modified glass-ionomer cements" rather than "plastic modified glass-ionomer cements". The results obtained should be better structured with the presence of data in tables, not just graphically represented by diagrams. There is no information about the specific dental status and oral hygiene status of the children on whom the relevant analyzes have been performed. The statistical methods are already textually refined. There is no systematic assessment of caries risk of the studied groups of children, and this is a factor that must be considered and described. The document from the Ethics Committee dates well after the start of the clinical trials, and should be available before the start of the research itself, in order for it to make sense.

IX. Author's summary

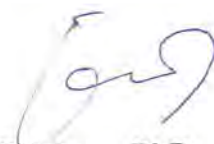
The author's summary is written on 53 pages as required and reflects the most important of the dissertation. In terms of structure and content, it correctly presents the main results of the dissertation development. It includes scientific conclusions, contributions, publications and participation in Bulgarian and international congresses.

X. Conclusion

In conclusion, after summarizing what has been said so far, I believe that Dr. Lilyana Hristova Shtereva presents a dissertation with thematic relevance, containing scientific results and meeting the requirements of Law for development of the academic staff in the Republic of Bulgaria and the Regulations of MU - Plovdiv.

The dissertation deals with a current topic. The doctoral student has knowledge in the scientific specialty of pediatric dentistry. The developed work demonstrates opportunities for gathering and interpreting scientific information.

This gives me reason to give my positive assessment of the presented dissertation on "Diagnostics and control of silanization of first permanent molars." I propose to the scientific jury to award the educational and scientific degree "Doctor" to Dr. Lilyana Hristova Shtereva, self-training PhD student in a doctoral program in "Pediatric Dentistry".



Prof. Dr. Ani Belcheva, PhD

18.02.2022г.