

## REVIEW

by

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Regarding the dissertation titled "**Alternative tooth preparation methods for complete crowns**" for awarding the educational and scientific degree "PhD" to **Dr. Magdalena Norman Gugleva**, a doctoral student in independent preparation, Department of Dental Materials Science and Prosthetic Dental Medicine, Faculty of Dental Medicine, Medical University – Varna.

**Scientific supervisor:** Assoc. Prof. Dr. Iveta Katreva, DMD, PhD.

The dissertation presented for review is relevant, properly structured, and includes the mandatory parts for dissertation development - literature review, objectives and tasks, materials and methods, results and discussion of the results, conclusion, and findings.

The dissertation comprises 192 pages with 4 appendices. It is illustrated with 161 figures and 12 tables. The bibliography contains 352 literary sources, including 32 in Cyrillic and 320 in Latin script.

The distribution of the dissertation parts is as follows: 2 pages introduction, 51 pages literature review, 95 pages objectives and tasks, own research, own results and discussion, 4 pages conclusion and findings.

Three publications related to the dissertation's theme are presented in international scientific journals.

### **Biographical data**

Dr. Magdalena Norman Gugleva was born in 1992 in Varna, Bulgaria. In 2017, she graduated as a master's degree - doctor at the Faculty of Dental Medicine, Medical University – Sofia. In 2022, she acquired a specialty Prosthetic dental medicine.

Since 2018, she has been a regular assistant at the Department of Dental Materials Science and Prosthetic Dental Medicine, Faculty of Dental Medicine, Medical University – Varna. Dr. Gugleva is a member of the Bulgarian Dental Association (BDA). She is proficient in English and Russian.

The relevance of the topic is determined by contemporary requirements for optimal prosthetic rehabilitation of patients with indications for the fabrication of full crowns. Temporary prosthetic restorations are an essential component in the overall prosthetic treatment plan, ensuring that the definitive crowns produced exhibit high functional and aesthetic qualities.

The biologically oriented preparation technique is gentle towards soft tissues, exhibits pronounced preventive value regarding dental structures, and makes a significant contribution to aesthetics.

In the **introduction**, the author emphasizes that the indications for treatment with full coverage crowns are strictly governed by preventive, functional, and aesthetic criteria,

compliance with which is a duty of every dental practitioner. Additionally, it is essential to have knowledge and application of basic principles for precise and minimally invasive tooth preparation, ensuring a lasting therapeutic and preventive effect of the prosthetic structure. In prosthodontics, especially in the visible area of the dentition, the restoration of function and the achievement of highly aesthetic results with durable and biocompatible materials are of particular importance.

**The literature review** elucidates various aspects of the topic, including anatomical features of the gingiva, types of preparation margins, characteristics of the biologically oriented preparation technique, contemporary requirements for temporary restorations and methods for their fabrication, means and methods for gingival retraction, conventional and digital impression techniques, requirements for permanent constructions, histology, and regeneration of the periodontal complex, among others. In the analysis of the literature review, titled "Conclusions," modern trends and requirements for the preparation of hard dental structures to achieve long-term stability of soft tissues are formulated. The review addresses both clarified and insufficiently clarified issues regarding the periodontal response and its clinical assessment when employing the biologically oriented preparation technique.

**The purpose** is a logical conclusion derived from a precise analysis of the literature review - to demonstrate the advantage of the biologically oriented preparation technique in prosthetic treatment with full veneer crowns in the esthetic zone and to evaluate the clinical results of its application. The purpose and the four accompanying tasks align perfectly with the topic and the content of the dissertation. The formulated tasks are sufficient for presenting and thoroughly discussing the issues related to monitoring the periodontal response in the treatment with full veneer crowns after temporary constructions made using various technologies.

Adequate **material** is presented for each task, and original research has been conducted to achieve reliable results and objective conclusions.

The **research methods** are appropriately selected and applied sequentially in the following order:

1. Two-step two-phase impressions are taken with a standard tray and C-silicone for both upper and lower jaws, and occlusal registration with PVS impression material in a state of central occlusion. Scanning of the gypsum models with an extraoral laboratory scanner and digital design of temporary egg-shell type constructions using specialized CAD software - 3Shape Dental System®. Preliminary temporary constructions are fabricated using a subtractive method – milling from PMMA with an approximate wall thickness of 0.3 mm.
2. Measurement of the depth of the gingival sulcus at six points for each tooth before tooth preparation using the Biologically Oriented Preparation Technique (BOPT) with diamond burs of appropriate shapes.
3. Clinical reseating of the previously fabricated temporary constructions with dual-polymerizing plastic and thickening of the crown edge with resin. Fixation with temporary resin cement.
4. One-step two-phase impressions following gingival retraction with two cords according to the morphological characteristics of the gingiva.
5. Digital impressions with an extraoral laboratory scanner and digital design of permanent constructions using specialized CAD software - 3Shape Dental System®.
6. The final constructions are made of multilayered zirconium dioxide (full contour) using a subtractive technology through milling and fixed with glass-ionomer cement.

7. Evaluation of the periodontal response for each patient by measuring three indicators - presence or absence of bacterial plaque; bleeding on probing, and thickness of the free marginal gingiva. Measurements were taken before the start of treatment (T0), 2 months after cementing temporary constructions (T1), and 6 months after cementing permanent constructions (T2).
8. Scanning of the two-step two-phase impression with an extraoral laboratory scanner and creating a virtual model on which the design of temporary constructions is built, then milled from PMMA.
9. Development of an algorithm for making temporary restorations using the direct-indirect method with the "egg-shell" technique.
10. Preparation of two anonymous survey forms directed towards dentists and dental technicians. A survey was conducted among 72 dentists regarding awareness of BOPT and the possibility of shaping the gingival contour through the profile of full veneer crowns.
11. Investigated the level of awareness regarding the fabrication of non-removable prosthetic constructions on teeth prepared using BOPT among 43 dental technicians.
12. Statistical parametric and non-parametric methods and programs for statistical analysis.

**The execution of the main tasks is summarized in specific results as follows:**

1. Before the start of treatment, bleeding on probing is observed in 61% of the incisors in the test group. In the stages of temporary restorations, fabricated using the direct-indirect method, and after cementing the permanent crowns, bleeding is observed in only 11% of the incisors.
2. The thickness of the free gingival margin on the incisors at the initial stage of treatment is  $1.33\text{mm} \pm 0.29\text{mm}$ . Two months after placing the temporary restorations, this value is  $1.44\text{mm} \pm 0.33\text{mm}$ , and 6 months after cementing the permanent restorations, it is  $1.45\text{mm} \pm 0.33\text{mm}$ .
3. The presence of plaque in the canine group is found in 75% at the initial stage, while in the next two stages, it is only 25%. Bleeding on probing is present in 75% at the initial phase, while in the stages with temporary and permanent restorations, bleeding is absent.
4. The thickness of the free gingival margin in the canine group at the initial stage of treatment is  $0.76\text{mm} \pm 0.082\text{mm}$ . Six months after cementing the permanent restorations, this value is  $0.95\text{mm} \pm 0.065\text{mm}$ .
5. The presence of plaque in the premolar group is found in 71% at the initial stage, while in the next two stages, it is 50% and 43% respectively. Before starting the treatment, bleeding on probing is observed in 71% of the teeth in the premolar group, while in the stages of temporary restorations and after cementing the permanent crowns, it is 21% and 14% respectively.
6. The thickness of the free gingival margin in the premolar group before starting the treatment is  $1.01\text{mm} \pm 0.21\text{mm}$ . Two months after placing the temporary restorations, it is  $1.06\text{mm} \pm 0.23\text{mm}$ , and 6 months after placing the permanent restorations, it is  $1.08\text{mm} \pm 0.24\text{mm}$ .
7. In tracking the periodontal response for all examined teeth, after temporary restorations made by the indirect digital method, plaque is observed in 67% of them before starting the treatment. When considering the results 2 months after cementing the temporary restorations and 6 months after cementing the permanent ones, a decrease in the value is observed - 40% and 33% respectively.

8. Bleeding on probing in the first stage is found in 60% of the examined teeth, while in the next two phases, it is 13%. Data from measuring the thickness of the free gingival margin for all examined teeth before starting the treatment show an average value of  $1.101\text{mm} \pm 0.247\text{mm}$ , in stage T1 the values are on average  $1.204\text{mm} \pm 0.230\text{mm}$ , and in the last stage, the average thickness of the marginal gingiva is  $1.229\text{mm} \pm 0.220\text{mm}$ .
9. A clinical algorithm has been developed to facilitate dentists in the process of creating temporary restorations using the direct-indirect method, aiming to ensure repeatable and predictable results.
10. Two types of survey forms were developed, targeting dentists and dental technicians, regarding BOPT and its clinical application. The survey results are properly systematized in text and diagrams.

The obtained **results** for all tasks are reliable and well-analyzed.

**The conclusions** are formulated optimally, with an emphasis on the contributions in the dissertation work.

The most significant **scientific and practical contributions** in the dissertation are **original** and include:

1. The periodontal response of soft tissues after prosthetic treatment with fixed prosthetic restorations on teeth prepared using a biologically oriented preparation technique has been investigated and clinically evaluated.
2. The periodontal response after applying two different methods for fabrication temporary restorations has been compared.
3. An alternative to vertical preparation margins technique has been presented.
4. An algorithm is developed for fabrication of temporary constructions by direct-indirect method with the "egg-shell" technique using biologically oriented preparation technique.

#### **Confirming contributions:**

1. It has been confirmed that the application of a biologically oriented preparation technique results in a biotolerant behavior of the teeth-surrounding soft tissues towards fixed prosthetic restorations.
2. It has been confirmed that after preparation using the biologically oriented preparation technique around the crown margins of fixed prosthetic restorations, there is reduced plaque retention.
3. It has been confirmed that the application of a biologically oriented preparation technique results in reduced bleeding on probing around the permanent fixed prosthetic restorations.
4. It has been confirmed that the biologically oriented preparation technique leads to an increase the thickness of the free gingival margin.

## Abstract

The abstract fully corresponds to the content of the dissertation and is developed in accordance with the academic requirements adopted in our country. The tables, figures, and diagrams presented in it provide comprehensive information about the conducted research and the obtained results.

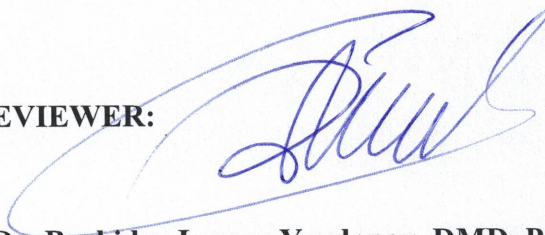
## Conclusion

Dr. Magdalena Norman Gugleva's dissertation on the topic "**Alternative tooth preparation methods for complete crowns,**" aiming to confer the academic and scientific degree "PhD," is the personal work of the author and a scientific endeavor that contributes significantly with its original scientific and applied nature.

I provide an overall positive assessment of the dissertation and confidently cast my vote with a "Yes" for awarding the academic and scientific degree "PhD" to Dr. Magdalena Norman Gugleva.

18.11.2023 г.  
гр. София

REVIEWER:



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