REVIEW

By Prof. Tihomir Dobrinov Georgiev, DMD, DSc

Appointed member of the Scientific Jury by order № P-109-307/12.06.2023
Of the Rector of MU-Varna

Regarding: **Acquisition of the educational and scientific degree** "Doctor" in the field of higher education 7. Healthcare and Sports. Professional field 7.2. Dental Medicine. Doctoral program "Oral surgery" at the Department of Oral Surgery, Faculty of Dental Medicine, Medical University of Varna "Prof. Dr. Paraskev Stoyanov"

On **dissertation** on the topic: **"**Ridge Preservation Using Guided Regeneration, Free Gingival Grafts, and Platelet-rich Plasma"

Author: Ralitsa Vladimirova Yotsova, DMD – Ph.D. student, full-time educational program

Scientific Supervisor: Prof. Rossen Kolarov, DMD, PhD

I. Brief biographical data

Dr. **Ralitsa Vladimirova Yotsova** was born in 1992 in the town of Omurtag.
In 2011 she graduated from the First Language School – Varna.
In 2017 she graduated from the Medical University of Varna "Prof. Dr. Paraskev Stoyanov" with a Master's degree "Doctor in Dental Medicine".
In 2017 she was a part-time assistant at the Department of Oral and Maxillofacial Surgery, Faculty of Dental Medicine, MU-Varna and since 2018 she has been a full-time assistant at the same department.
Since 2020 she has been enrolled as a Ph.D. student in a full-time doctoral program "Oral Surgery" and as an Oral Surgery Resident. Since she was enrolled as an assistant she has been teaching Oral surgery to students from the 3rd, 4th, 5^{th,} and 6th years of their education.
Speaks fluent English.
Member of the BDA.

II. Volume and structure of the presented dissertation

The dissertation "Ridge Preservation Using Guided Regeneration, Free Gingival Grafts, and Platelet-rich Plasma" developed by Dr. Ralitsa Vladimirova Yotsova is extremely relevant and up-to-date with its scientific and practical nature.

The dissertation consists of 283 pages and is illustrated by 133 tables and 123 figures. The bibliography cites 561 literature sources, 4 of which are in Cyrillic and 557 in Latin.

The Ph.D. candidate has submitted 3 scientific publications related to the dissertation, in which she is the first author.

III. Aim and tasks

The current dissertation aims to investigate the influence of platelet-rich plasma, non-porous PTFE barrier membranes, and autogenous free gingival grafts on healing processes in post-extraction sites.

For this aim, she sets the following **tasks**:

1. To investigate the application of non-porous dense PTFE membranes for guided regeneration in the post-extraction sockets of the posterior teeth (premolars and molars).
   - 1.1. To perform a quantitative evaluation of the bone in the post-extraction sites by measuring the height and width of the alveolar crest immediately after the extraction and the height of the alveolar crest three months after the extraction.
   - 1.2. To analyze the relationship between the quantitative change in the height of the bone plates after three months and some factors (group of teeth, maxillary/mandibular teeth, dental diagnosis, smoking status).
   - 1.3. To determine whether the change in height is the same for both bone plates and whether there is a relationship between the width of the bone plates (buccal and palatal/lingual) measured immediately after extraction and the quantitative change in their height after 3 months.

1. To investigate the application of non-porous dense PTFE membranes in combination with platelet-rich plasma for guided regeneration in the post-extraction sockets of the posterior teeth (premolars and molars).
   - 1.1. To perform a quantitative evaluation of the bone in the post-extraction sites by measuring the height and width of the alveolar crest immediately after the extraction and the height of the alveolar crest three months after the extraction.
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1.3. To determine whether the change in height is the same for both bone plates and whether there is a relationship between the width of the bone plates (buccal and palatal/lingual) measured immediately after extraction and the quantitative change in their height after 3 months.

2. To investigate the influence of autogenous free gingival grafts on bone regeneration in the post-extraction sockets of the posterior teeth (premolars and molars).
   2.1. To perform a quantitative evaluation of the bone in the post-extraction sites by measuring the height and width of the alveolar crest immediately after the extraction and the height of the alveolar crest three months after the extraction.
   2.2. To analyze the relationship between the quantitative change in the height of the bone plates after three months and some factors (group of teeth, maxillary/mandibular teeth, dental diagnosis, smoking status).
   2.3. To determine whether the change in height is the same for both bone plates and whether there is a relationship between the width of the bone plates (buccal and palatal/lingual) measured immediately after extraction and the quantitative change in their height after 3 months.
3. To investigate bone regeneration in the post-extraction sockets of the posterior teeth (premolars and molars) without the application of any ridge preservation procedures (control group).
   3.1. To perform a quantitative evaluation of the bone in the post-extraction sites by measuring the height and width of the alveolar crest immediately after the extraction and the height of the alveolar crest three months after the extraction.
   3.2. To analyze the relationship between the quantitative change in the height of the bone plates after three months and some factors (group of teeth, maxillary/mandibular teeth, dental diagnosis, smoking status).
   3.3. To determine whether the change in height is the same for both bone plates and whether there is a relationship between the width of the bone plates (buccal and palatal/lingual) measured immediately after extraction and the quantitative change in their height after 3 months.
4. To evaluate and compare the results from all experimental groups.

IV. Significance of the topic and relevance of the aim of the dissertation

The topic of the dissertation is significant for the Bulgarian science and practice. She examines modern methods for guided regeneration in post-extraction sockets using barrier membranes, autologous platelet concentrates, and free full-thickness gingival grafts. Based on world and personal experience, the doctoral candidate analyzes results and suggests a work protocol for preserving the available bone volume after tooth extraction and thus creating optimal conditions for the subsequent implant/prosthetic rehabilitation of the dentition. Therefore, the topic is relevant and significant for Bulgarian dental science and medical practice.

V. Results

Dr. Yotsova comprehensively and analytically presents the results of the studied techniques and compares them with a control group. A proprietary methodology was used to measure the height of the bone plates of the sockets using CBCT immediately after the extraction and 3 months after the applied methods. The results and discussion are illustrated by tables and diagrams. The conclusions correspond to the obtained results and demonstrate that the considered methods successfully reduce the amount of vertical post-extraction resorption of the alveolar ridge.

VI. Conclusions

Based on the reported and analyzed clinical results, Dr. Yotsova has drawn the following conclusions:

1. The application of the considered ridge preservation methods (with non-porous PTFE membranes; with non-porous PTFE membranes and PRP; with free full-layer gingival grafts) reduced the vertical resorption of the buccal and palatal bone plates.

2. The three applied methods gave similar results, but the methods based on guided regeneration (with non-porous PTFE membranes with/without PRP) were superior to the application of free gingival grafts in terms of preserving the vertical dimensions of the walls.

3. Platelet-rich plasma did not improve the results achieved with non-porous PTFE membranes in terms of preserving the vertical dimensions of both bone plates.

4. Ridge preservation procedures could reduce the risk of vertical loss > 2 mm in both bone plates of the sockets.

5. The behavior after extraction – with or without ridge preservation is a determining factor for vertical bone resorption.

6. The width of the buccal bone plate affects the amount of its vertical resorption, but its influence is much less significant than the behavior after extraction (with/without ridge preservation).

7. Ridge preservation methods could significantly compensate for the resorption of thin socket walls, but not completely neutralize the influence of the width as a factor.

8. The width of the buccal plate is greater in the lower jaw compared to the upper jaw, and in the molar region compared to the premolar area, but with no statistically significant difference between them.

9. There is no strong evidence that the considered local and systemic factors (jaw, area of the dentition – premolar/molar, diagnosis, and smoking status) influence the vertical resorption of the alveolar crest over a period of 3 months after extraction.

VII. Contributions

Based on the conducted research and the conclusions drawn, the following contributions have been reported:

Original contributions

1. We proposed our original methodology for measuring the height of the bone plates of the socket relative to the maxillary sinus and the mandibular canal on cone-beam computed tomography.

2. For the first time, the simultaneous use of non-porous PTFE membranes and platelet-rich plasma as a method for guided regeneration in post-extraction sockets was investigated.

3. We proved that the application of PRP did not improve the results of guided regeneration with non-porous PTFE membranes regarding the preservation of the vertical dimensions of both buccal and palatal/lingual socket plates.

4. For the first time, a comparative analysis of the following three ridge preservation methods was performed: with an application of PTFE membranes, with a combination of PTFE membranes and PRP, and with free full-thickness gingival grafts.

Contributions original for the country

5. For the first time in our country, non-porous PTFE membranes were applied as a method for ridge preservation.

6. For the first time in our country, full-thickness gingival grafts were applied as a method for ridge preservation.

7. For the first time in the country, the influence of ridge preservation methods on the change in the height of the buccal and palatal/lingual bone plate was investigated.

8. For the first time in our country, the influence of the width of the bone plates on the amount of their vertical resorption was investigated.

9. For the first time in the country, the role of the type of jaw, the area of the dentition, the diagnosis, and smoking status on the vertical resorption of the socket walls with/without

the application of RP was investigated.

Confirmatory contributions

1. We confirmed that ridge preservation methods could successfully reduce vertical post-extraction resorption of the socket walls compared to those left on spontaneous healing.

2. We confirmed that the application of non-porous PTFE membranes could reduce the post-extraction vertical resorption of the socket walls.

3. We confirmed that the application of full-thickness gingival grafts could reduce the post-extraction vertical resorption of the socket walls.

4. We confirmed that smoking did not affect the amount of vertical resorption of the socket walls.

VIII. Characteristics and evaluation of the dissertation

The research design includes properly selected materials and research methods for all tasks, which ensures the reliability of the results and contributions. The dissertation of Dr. Ralitsa Yotsova is structured correctly, contains all the elements of scientific work, and meets the requirements of the Law for the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for the Development of the Academic Staff at the MU-Varna.

The results are correctly described and comprehensively analyzed. They cover all aspects of the dissertation tasks, which allows the fulfillment of the dissertation aim.

IX. Significance of the dissertation and evaluation of the personal contribution of the Ph.D. candidate

The conducted examinations of the patients and evaluation of their results are the personal work of the dissertation student. The resulting conclusions and contributions are of high scientific and clinical significance. The abstract was developed according to the accepted academic requirements. Its content and presentation cover all parts of the presented scientific work.

X. Conclusion

The aforementioned gives me a reason to draw the following conclusion:

My overall assessment of Dr. Ralitsa Yotsova's dissertation on the topic "Ridge Preservation Using Guided Regeneration, Free Gingival Grafts, and Platelet-rich Plasma" is positive. The study meets the criteria for a dissertation for the award of the educational and scientific degree "Ph.D.". It contributes to dental medicine and oral surgery in particular, clearly demonstrating that Dr. Yotsova knows the modern specialized literature in its scope and profile and has extensive clinical and research experience.

I give my affirmative vote and suggest to the respected members of the scientific jury to award Dr. Ralitsa Yotsova the educational and scientific degree "Ph.D.".

Varna
24.08.2023

Reviewer:
(Prof. Tihomir Georgiev, DMD, DSc)