

REVIEW

by

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by Prof. Dr. M. Tokmakova, DM,

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Regarding:

Dissertation for the acquisition of the educational and scientific degree "Doctor"

by **Dr. Lyubomir Ivanov Chenchev**

on the topic: **"Minimally Invasive Tooth Extraction"**

Scientific Supervisor:

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Presentation of the Dissertation and Biographical Data of the Doctoral Candidate

A dissertation and an abstract on the topic: *"Minimally Invasive Tooth Extraction"* have been submitted for review. Three scientific publications related to the research topic are attached to the dissertation – one published in an international scientific journal and two in Bulgarian scientific journals. Additionally, three conference papers presented at scientific forums held in Bulgaria have been prepared and submitted.

Brief Biographical Data of the Doctoral Candidate

Dr. Lyubomir Ivanov Chenchev was born in 1995 in the city of Plovdiv. In 2020, he graduated from the Faculty of Dental Medicine at the Medical University – Plovdiv. He obtained a specialty in Oral Surgery in 2024. In the same year, he was admitted as a full-time doctoral student at the Department of Oral Surgery, Faculty of Dental Medicine – Medical University of Plovdiv. Since 2020, he has been working as an assistant in the same department, and since 2025 – also in the Department of Dental Implantology. He is a member of the Bulgarian Dental Association (BDA), the Union of Scientists in Bulgaria (USB), and the European Association for Osseointegration (EAO). He is fluent in English and Spanish.

The dissertation includes all the essential components of a scientific work: a literature review, clearly defined objectives and tasks, a description of the materials and methods used, presentation and discussion of the results, as well as a conclusion with key findings. The topic is relevant and aligns with current trends in medical practice aimed at implementing minimally invasive surgical procedures based on scientific evidence. The scientific and educational contribution of the work is timely, particularly in the context of growing public expectations for safe and gentle surgical interventions associated with minimal postoperative complications and risks.

The dissertation is presented on 141 pages and includes one appendix. It contains 58 figures and 7 tables. The bibliography covers 100 literary sources, of which 99 are in Latin script and 1 in Cyrillic script.

The distribution of the content is as follows:

- Introduction – 2 pages
- Literature review – 33 pages
- Aim and tasks – 2 pages
- Method and materials – 19 pages
- Original research, results, and discussion – 66 pages
- Conclusions, findings and contributions – 1 pages

The dissertation includes an introduction (2 pages) in which the research problem is clearly formulated and the scientific and practical interests of the doctoral candidate are outlined. The emphasis is placed on the need for a change in the mindset of dental practitioners regarding tooth extraction, highlighting its importance in the context of early rehabilitation of masticatory function and the restoration of dental defects through dental implants. Special attention is given to the awareness of the necessity to preserve bone structures as much as possible during tooth extraction.

Tooth extraction is no longer viewed solely as a procedure for removing inflammatory processes or pathologies but as an intervention whose consequences can lead to significant loss of alveolar bone and, consequently, difficulties in subsequent prosthetic or implantological rehabilitation.

The literature review (33 pages) traces the historical development of tooth extraction methods in humans across different eras. The classical approach is presented clearly and objectively, without unnecessary emphasis. The concept of atraumatic extraction is detailed, with special attention given to the associated loss of bone tissue in the area of the alveolar ridge, supported by current scientific data.

The review includes an in-depth examination of the modern approach to **vertical extraction**, whose main goal is to minimize surgical trauma to the alveolar bone. At the end of this section, the unresolved issues on the topic are summarized, with the doctoral candidate clearly arguing the need for original research comparing the outcomes of extraction using classic physical forceps and those using the Benex vertical extraction system.

Objective of the Dissertation

The objective of the dissertation is clearly formulated and fully aligned with the chosen topic: **“To study the awareness of modern systems for minimally invasive tooth extraction among practicing colleagues in Bulgaria and to investigate the capabilities of two contemporary tooth extraction methods for achieving atraumatic tooth extraction.”**

Tasks of the Dissertation

Three main tasks have been formulated, directly corresponding to the stated objective and research topic. The sub-tasks under the second and third tasks are well-structured and logically justified. Each task is supported by enough material, allowing for statistical analysis and obtaining reliable results.

First Task:

To conduct an anonymous survey among the members of several regional chapters (RC) of the Bulgarian Dental Association (BDA) on the topic:

„Awareness of modern systems for minimally invasive tooth extraction“ – *Appendix A.*

Second task:

Clinical evaluation of two systems for atraumatic tooth extraction:

- **First subtask:**

To conduct a comparative clinical evaluation between the **Benex** vertical tooth extraction system and the classical instruments.;

- **Second subtask:**

To conduct a comparative clinical evaluation between physical forceps and classical instruments.

Third task:

Subjective evaluation and assessment of the healing period using two systems for atraumatic tooth extraction:

- **First subtask:**

To conduct a comparative subjective evaluation of pain and assessment of the healing period between the **Benex** system and classical instruments;

- **Second subtask:**

To conduct a comparative subjective evaluation of pain and assessment of the healing period between **physical forceps** and classical instruments..

The formulated objective of the dissertation is clearly defined, specific, and fully corresponds to the research topic. It reflects both the current trends in dental medicine toward the application of minimally invasive methods and the need to increase awareness among practicing dentists regarding modern alternatives to classical extraction. The combined nature of the objective—which includes both a survey of knowledge within the professional community and a clinical evaluation of the effectiveness of different extraction methods—provides comprehensiveness and practical relevance to the study.

The three formulated main tasks are logically subordinate to the stated objective and are clearly structured. They reflect the comprehensive approach adopted by the doctoral candidate.

The first task, focused on the survey study, is significant for revealing the current state of awareness and practices within the dental community. It serves as a foundation for justifying the need to introduce and promote modern extraction methods.

The second task is aimed at an objective clinical evaluation of two innovative approaches – the **Benex** system and physical forceps – compared to classical instruments. The sub-tasks are

clearly formulated and methodologically comparable, allowing for quantitative analysis of the effectiveness of the tooth extraction methods used.

The third task complements the clinical evaluation with the patient's subjective perspective, focusing on pain symptoms and the healing process. This way, the patient experience is also covered, which is essential for assessing minimally invasive methods as predictable and gentle.

Each of the tasks is supported by enough material, allowing for statistically reliable conclusions to be drawn. The structuring of the sub-tasks is precise and demonstrates good methodological planning.

Method and materials

The first task was carried out through a well-organized **survey involving 144 dental practitioners**, providing a reliable sample for studying awareness of modern minimally invasive extraction systems. The use of an **electronic platform (Microsoft Forms)** is a contemporary and effective solution, enabling quick data collection and processing. The formulation of **12 questions** is a reasonable choice, ensuring sufficient depth of the survey without causing participant dropout due to the length of the questionnaire.

The distribution of the survey among **three different regional chapters of the Bulgarian Dental Association (Plovdiv, Sofia, Haskovo)** allows for a comparative and geographically representative analysis. This selection covers both the capital and major non-capital centers, which strengthens the external validity of the study.

Second and third task

The clinical part of the study was conducted at the Department of Oral Surgery and the Implantology Center of the Research Institute at Medical University – Plovdiv, ensuring a high level of professionalism and scientific validity. The study period—from September 2021 to June 2023—is fully sufficient for gathering a representative clinical sample and monitoring the results in the short-term postoperative period.

The study **includes 116 patients**, randomly assigned **into three equal groups**, which is a correct experimental approach that eliminates bias and improves the comparability of the results. The distinction between the groups — **a control group (classical instruments), test group 1 (Benex), and test group 2 (physical forceps)** — is logical and methodologically

justified, allowing for a direct evaluation of the effectiveness of two modern alternatives compared to the standard approach.

Following the extractions, a **clinical evaluation** was conducted on both the effectiveness of the instruments used and the **degree of alveolar bone preservation** — a key indicator in assessing the trauma of the procedure and the subsequent therapeutic possibilities.

Patient follow up includes:

Pain assessment – on 1st, 3rd and 7th day.

Assessment of the healing of the extraction wound on days 3, 7, and 10.

This approach allows monitoring of both the early inflammatory processes and pain symptoms, as well as the dynamics of tissue healing.

The **inclusion criteria** for the study were appropriately selected, limiting participation to patients with good overall and oral health status:

- Clear indications for extraction
- Presence of adjacent teeth (ensures clinical relevance of the procedure)
- ASA I and II condition
- Good oral hygiene
- Signed informed consent

These conditions exclude the influence of systemic diseases or poor hygiene on the results and contribute to the internal validity of the study.

Clinical methods: The success of the extraction was measured on a scale from 1 to 5. First, the results comparing the mean success values were presented using an independent-samples t-test. These were complemented by an analysis of extraction success in percentages, using cross-tabulations and the Chi-square test.

The assessment of extraction success was performed using a scoring scale proposed by Choi et al. and modified by Patel et al.

The preservation of the buccal bone was examined according to specified criteria, which are detailed, along with the criteria used for assessing the healing of the extraction wound.

Treatments methods: Extraction of teeth and tooth roots using classical forceps and elevators is described, including the methodology of the extraction procedure. The extraction method using the vertical system—Benex—is also detailed, with the process of performing the method very clearly illustrated.

Statistical methods:

Statistical methods for the first task include determining the number and relative proportion of respective responses and establishing relationships between certain answers using Fisher's exact test for dichotomous responses or the Chi-square test for responses with more than two options. To clarify the association between a dichotomous and an ordinal variable (such as work experience), an analysis was conducted using Spearman rank-order correlation. The statistical methods used for the second and third tasks are aligned with the objectives and tasks of the dissertation and are appropriate for the types of variables analyzed.

Summary of the results from the completion of the main tasks:

1. The study found that almost all practitioners perform tooth extractions. However, the majority are not familiar with alternative extraction tools, even though they consider the established classical instruments to be less than ideal.
2. The results indicate that minimally invasive tooth extraction can be achieved using classical forceps and elevators, but the predictability of the outcome can be improved by using certain more modern tools in specific clinical cases.
3. The finding that less traumatic tooth extraction is associated with less postoperative pain and faster early wound healing is confirmed by the results.
4. Based on the results, the conclusion is drawn that minimally invasive tooth extraction is not necessarily determined by the instrument used, but largely depends on the choice of method in the specific clinical case, as well as being related to the operator's experience.
5. Не се установява убедително доказателство, че класическите клещи и лостове са неспособни да отговорят на съвременните изисквания за екстракция на зъби.

The **results** from for all tasks are well analyzed and thoroughly discussed in the context of existing research in the scientific literature on the subject.

The **discussion** of the results is conducted accurately, presented as a comparison with other authors and their research findings.

Contributions:

For the first time in Bulgaria, a study has been conducted on the impact of surgical trauma during tooth extraction on the healing process. Clear criteria defining what constitutes minimally invasive extraction have been presented. Within this research, for the first time in the country, a clinical evaluation of modern extraction tools has been carried out, examining their applicability, advantages, disadvantages, and their ability to provide less traumatic extraction compared to classical forceps and elevators. The survey revealed a significant lack of awareness among some dental practitioners about these modern alternatives and highlighted a growing interest and demand for predictable, minimally invasive approaches that meet the high standards of contemporary dental medicine.

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

Author's Abstract

The abstract corresponds to the content and complies with the established academic and scientific requirements.

Conclusion

The dissertation submitted for review by Dr. Lyubomir Ivanov Chenchev, entitled "Minimally Invasive Tooth Extraction," is an original scientific work by the doctoral candidate, a specialist in the field of oral surgery. The dissertation meets the requirements for awarding the educational and scientific degree of "Doctor," and the achieved results, findings, and conclusions contribute both to Dr. Chenchev's personal professional and academic development and to the professional community of dentists, oral surgeons, and professors.

I hereby give my full positive evaluation of the dissertation and will vote "Yes" for awarding the educational and scientific degree of "Doctor" to Dr. Lyubomir Ivanov Chenchev.

Sofia,
11.06.2025

Signature
/Prof. Dr. Pavel Stanimirov, PhD/

Заличено на основание
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