VOLUME-3, ISSUE-11

CLINICAL EFFECTIVENESS OF VARIOUS TOOTH-WHITENING METHODS FOR DENTAL DISCOLORATION: AN EXPANDED COMPARATIVE ANALYSIS

Furkatov Shokhjakhon Furkatovich[1]
Ismatova Iroda Farkhod kizi[2]
Samarkand State Medical University[1]
Tashkent State Medical University[2]

Relevance. Dental discoloration is a prevalent concern that frequently prompts patients to seek cosmetic dental care, as changes in tooth color substantially influence the aesthetic perception of the smile and overall quality of life. Contemporary dentistry offers a spectrum of whitening methods that differ in their mechanisms of action, degree of color alteration, and safety profiles. With the growing demand for minimally invasive aesthetic interventions, there is an increasing need for comprehensive evaluation of these methods to facilitate evidence-based clinical decision-making, optimize treatment selection for individual cases, and minimize the risk of adverse outcomes.

Objective. This study aimed to conduct a detailed comparative assessment of the clinical effectiveness, stability, and patient tolerability of in-office, at-home, and minimally invasive tooth-whitening procedures in patients presenting with various forms of dental discoloration. Additionally, the study sought to identify factors influencing predicted outcomes and the likelihood of post-procedural complications.

Materials and Methods. The study cohort comprised 84 patients aged 18–54 years who presented with concerns regarding tooth discoloration. Participants were stratified into three groups according to the whitening modality employed:

1. In-office whitening utilizing high-concentration peroxide systems activated under standardized clinical parameters;
2. At-home whitening with individualized trays and low-concentration gels applied over a 10–14 day regimen;
3. Minimally invasive procedures, including microabrasion of superficial enamel defects and resin infiltration, targeting localized discoloration.

Outcomes were evaluated based on shade change using the VITA Classical and 3D-Master scales, patient-reported post-procedural sensitivity, and the duration and stability of whitening effects over a 1–3 month follow-up period.

Results. In the in-office whitening group (n=28), patients experienced the most pronounced color improvement, with an average lightening of 3–5 shades on the VITA scale, typically achieved after a single session. Transient hypersensitivity was reported in 20–22% of patients, which required remineralizing interventions.

The at-home whitening group (n=29) demonstrated an average shade improvement of 2–4 tones**,** comparable to in-office outcomes over a prolonged course. The incidence of post-procedural sensitivity was substantially lower **(**~9%**)** due to the gradual application of low-concentration gels. Results remained stable throughout the 1–3 month follow-up period.

In the minimally invasive group (n=27), procedures such as microabrasion and enamel infiltration produced optimal results for localized, superficial discoloration related to structural enamel defects. Adverse reactions were minimal, and the aesthetic effect remained stable during the observation period.

Comparative analysis indicated that the degree of whitening is primarily dependent on the depth of discoloration and the concentration of the active agent, whereas patient comfort and safety correlate with the intensity and penetration depth of the chemical intervention.

Conclusion. This comprehensive analysis demonstrates that optimal clinical outcomes in tooth whitening are achieved through individualized treatment planning that considers the etiological nature of discoloration, enamel condition, intensity of staining, and patient sensitivity. Tailoring the whitening modality to these factors allows clinicians to maximize aesthetic improvement while minimizing the risk of complications. The findings underscore the importance of personalized, evidence-based approaches in contemporary aesthetic dentistry, ensuring both efficacy and patient satisfaction.

Literatures

1. Артёмова А. В., Полосухина Е. Н. Опыт лечения стойких дисколоритов депульпированных зубов на базе кафедры стоматологии терапевтической СГМУ им. ВИ Разумовского //Бюллетень медицинских интернет-конференций. – Общество с ограниченной ответственностью «Наука и инновации», 2015. – Т. 5. – №. 10. – С. 1203-1203.
2. Байтус Н. А. Эстетическое восстановление депульпированных зубов //Беларусь Украина. – 2020. – С. 277.
3. Беленова И. А. и др. Профилактика осложнений после профессионального осветления зубов //Вестник новых медицинских технологий. Электронное издание. – 2018. – Т. 12. – №. 6. – С. 29-34.
4. Беленова И. А., Рожкова Е. Н. Регистрация изменений минерализации эмали при применении препарата на основе ионов кальция и аминокислот //Актуальные проблемы медицины. – 2019. – Т. 42. – №. 4. – С. 488-496.
5. Березина Н. В., Силантьева Е. Н., Кривонос С. М. Оценка клинической эффективности внутреннего отбеливания зубов //Национальная ассоциация ученых. – 2015. – №. 6-3 (11). – С. 14-16.
6. Nazarenko Z. Y. et al. COMPARATIVE CHARACTERISTICS OF THE RESULTS OF PROFESSIONAL USE OF WHITENING SYSTEMS «OPALESCENCE BOOST» AND «MAGIC SMILE PRO».
7. Nefedova I. F. et al. Определение эффективности применения реминерализующего препарата на эмаль и дентин зубов методом растровой микроскопии после процедуры химического отбеливания: экспериментальное нерандомизированное исследование //Клиническая стоматология. – 2024. – Т. 27. – №. 4. – С. 34-39.
8. Nikolishyna E. V., Marchenko A. V., Nikolishyn I. A. EFFICIENCY OF TOOTH DISCOLORATION TREATMENT USING BLEACHING SYSTEMS WITH DIFFERENT TYPES OF ACTIVATION AND CONCENTRATION OF HYDROGEN PEROXIDE //WORLD OF MEDICINE AND BIOLOGY. – 2018. – №. 3. – С. 99-102.
9. Perkhach R. Y. et al. Method of Structural Semantic Analysis of Dental Terms in the Instructions for Medical Preparations //COLINS. – 2020. – С. 662-669.
10. Postnikov M. A. et al. A comparative assessment of the occurrence of hyperesthesia after a course of home teeth whitening with various kits //Aspirantskiy Vestnik Povolzhiya. – 2023. – Т. 23. – №. 2. – С. 27-31.
11. Titova O. Age aspects of treatment of teeth discoloritis //Actual problems in dentistry.— 2019. – 2019. – Т. 4. – С. 61-5.

12. Tiunova N. V., Naberezhnova S. S., Basheva O. S. The study of the roughness of the enamel surface during various types of refinishing in the process of minimally invasive treatment of dental fluorosis //VolgaMedScience. – 2022. – С. 567-569.
13. Vlasova N. et al. Influence of professional teeth whitening on oral hygiene: Long-term results //Journal of International Society of Preventive and Community Dentistry. – 2021. – Т. 11. – №. 4. – С. 408-413.
14. Zakharov V. et al. Aerographic application of composite dental materials: effective elimination of tooth enamel destruction and improvement of aesthetic qualities of discolorite treatment //Applied Information Aspects of Medicine (Prikladnye informacionnye aspekty mediciny). – 2024. – Т. 27. – №. 1. – С. 37-42.
15. Фуркатов, Ш. Ф. (2025). КЛИНИЧЕСКАЯ ЭФФЕКТИВНОСТЬ И ОПТИМИЗАЦИЯ МЕТОДОВ ЛЕЧЕНИЯ ДИСКОЛОРИТНЫХ ЗУБОВ. В Вестник фундаментальной и клинической медицины. (Т. 6, Выпуск 20, сс. 46–53). Zenodo. https://doi.org/10.5281/zenodo.17551336