



Long-term successful retreatment of a tooth with apical periodontitis following resorcinol-formalin endodontic treatment and apical root resection: a 25-year follow-up clinical case report

Elena V. Krikun¹ , Svetlana L. Blashkova¹ , Olga V. Budennaya¹ , Airat A. Salikhov²

¹ Kazan State Medical University, Kazan, Russian Federation

² Vash Doktor Dental Practice LLC, Kazan, Russian Federation

✉ helensand@mail.ru

Abstract

The resorcinol-formalin method, widely used approximately two decades ago due to its simplicity and low cost, has significant disadvantages, including cytotoxicity, incomplete root canal filling, increased tooth brittleness, discoloration, and ankylosis. It remains one of the common causes of exacerbation of apical periodontitis. Current trends in endodontic treatment are focused on tooth preservation. Therefore, tooth-preserving surgical procedures, such as root-end resection and hemisection, are recommended in selected cases. The key principle is a combination of a therapeutic phase aimed at eliminating intracanal biofilm and a surgical phase involving removal of periapical inflammatory lesions. This clinical case describes the treatment of a 54-year-old female patient with mandibular first molar (tooth 4.6) previously treated using the resorcinol-formalin method approximately 30 years earlier. In 2000, a radicular cyst was diagnosed, and root-end resection with cyst removal was performed. The tooth remained asymptomatic for 25 years. After this period, the patient developed pain on biting; cone-beam computed tomography revealed incomplete root canal filling and widening of the periodontal ligament space. Nonsurgical retreatment was performed using dental microscopy, advanced irrigation protocols, intracanal medication, an MTA apical plug, and vertical compaction of gutta-percha. One year after treatment, cone-beam computed tomography demonstrated a reduction in the periapical lesion and restoration of bone structure. Thus, even in cases with an unfavorable initial treatment history, such as previous resorcinol-formalin therapy, successful retreatment and long-term tooth preservation may be achieved. The elimination of intracanal infection combined with appropriate management of periapical pathology plays a decisive role in treatment success.

Keywords: apical periodontitis, radicular cyst, endodontic treatment, resorcinol-formalin method, root-end resection, root canal retreatment

Article information: received – 19.03.2026; revised – 30.04.2026; accepted – 22.05.2026

Conflict of interest: The authors declare no conflict of interests.

Acknowledgements: There are no funding and individual acknowledgments to declare.

For citation: Krikun E.V., Blashkova S.L., Budennaya O.V., Salikhov A.A. Long-term successful retreatment of a tooth with apical periodontitis following resorcinol-formalin endodontic treatment and apical root resection: a 25-year follow-up clinical case report. *Endodontics Today*. 2026;24(3):592–598. <https://doi.org/10.36377/ET-0222>

Клинический случай успешного перелечивания зуба с апикальным периодонтитом после резорцин-формалинового лечения и резекции верхушки корня с 25 летним наблюдением

Е.В. Крикун¹ , С.Л. Блашкова¹ , О.В. Буденная¹ , А.А. Салихов²

¹ Казанский государственный медицинский университет, Казань, Российская Федерация

² ООО Стоматологическая практика «Ваш доктор», Казань, Российская Федерация

✉ helensand@mail.ru

Резюме

Резорцин-формалиновый метод, популярный еще 20 лет назад из-за простоты и дешевизны, имеет серьезные недостатки: токсичность, неполное заполнение каналов, хрупкость и окрашивание зубов, анкилоз. Это одна из частых причин обострения апикальных периодонтитов. Современные тенденции эндодонтического лечения направлены на сохранение зуба. Рекомендуется применять

© Krikun E.V., Blashkova S.L., Budennaya O.V., Salikhov A.A., 2026

зубосохраняющие операции, такие как, например, резекция верхушки корня, гемисекция. Ключевым принципом является сочетание терапевтического этапа, заключающегося в устранении биопленки в корневых каналах и хирургического, подразумевающим удаление очага деструкции костной ткани. Представленный клинический случай демонстрирует лечение пациента 54 лет с зубом 4.6, леченным резорцин-формалиновым методом около 30 лет назад. В 2000 г. диагностирована радикулярная киста, проведена резекция верхушки корня с удалением кисты. Зуб не беспокоил 25 лет. Спустя 25 лет появилась болезненность; на снимке конусно-лучевой компьютерной томографии – неполное пломбирование каналов, расширение периодонтальной щели. Проведено перелечивание корневых каналов с использованием микроскопа, ирригации, лечебной пасты, апикальной пробки из МТА и вертикальной конденсации гуттаперчи. Через год мы наблюдали уменьшение очага деструкции и восстановление костной ткани. Таким образом, даже при исходно неблагоприятном фоне, таком как лечение резорцин-формалиновым методом, возможно успешное перелечивание и длительное сохранение зуба. Решающее значение имеет радикальное устранение инфекции в каналах в сочетании с хирургическим удалением деструкции.

Ключевые слова: апикальный периодонтит, радикулярная киста, эндодонтическое лечение, резорцин-формалиновый метод, резекция верхушки корня, перелечивание корневых каналов

Конфликт интересов: Авторы сообщают об отсутствии конфликта интересов.

Благодарности: Финансирование и индивидуальные благодарности для декларирования отсутствуют.

Для цитирования: Крикун Е.В., Блашкова С.Л., Буденная О.В., Салихов А.А. Клинический случай успешного перелечивания зуба с апикальным периодонтитом после резорцин-формалинового лечения и резекции верхушки корня с 25 летним наблюдением. *Эндодонтия Today*. 2026;24(3):592–598. <https://doi.org/10.36377/ET-0222>

INTRODUCTION

Until just two decades ago, the resorcinol-formaldehyde technique was one of the most widely used methods of endodontic treatment. Its popularity was largely attributed to its relative simplicity and affordability. However, accumulated clinical experience together with advances in evidence-based dentistry have revealed several fundamental limitations of this technique. These include incomplete root canal obturation, cytotoxicity of the resorcinol-formaldehyde paste, alterations in the mechanical properties of dental tissues resulting in increased brittleness, the development of ankylosis, and irreversible tooth discoloration. Furthermore, according to the available literature, the resorcinol-formaldehyde technique is one of the leading causes of apical periodontitis following endodontic treatment [1; 2]. Radiographic evaluation of periapical tissues in permanent teeth previously treated using this method demonstrated destructive periapical changes in 17 of 24 examined cases, including chronic fibrous periodontitis (23.9%), chronic granulomatous periodontitis (12.1%), and chronic granulating periodontitis (34.0%). The mandibular molar region has been identified as one of the most common sites of chronic apical periodontitis associated with this treatment approach [1–3].

Consequently, teeth with apical periodontitis previously treated using the resorcinol-formaldehyde technique are often considered for extraction. Nevertheless, the cornerstone of contemporary dentistry is minimally invasive treatment aimed at preserving the natural dentition whenever possible. Therefore, the selected treatment strategy should maximize tooth function while achieving the most favorable clinical outcome. Several tooth-preserving surgical procedures are available for this purpose, including apicoectomy, hemisection, root amputation, coronoradicular separation, and intentional replantation, allowing tooth pre-

servation even in complex clinical situations. Current evidence supports the effectiveness of tooth-preserving surgery for mandibular molars with inflammatory and destructive periapical lesions [4–6].

Apicoectomy consists of two essential components: endodontic retreatment and surgical intervention. Each stage serves a specific purpose, and their combination enables complete elimination of the chronic periapical inflammatory focus [6–9].

Successful nonsurgical endodontic retreatment requires the selection of an effective and safe instrumentation system. Several studies have demonstrated that the Reciproc system significantly reduces retreatment time and provides more efficient removal of gutta-percha from root canals than conventional rotary nickel-titanium (NiTi) instruments, as confirmed by micro-computed tomography (micro-CT). In addition, reciprocating instrumentation has been shown to reduce the risk of apical extrusion of filling material and the formation of dentinal microcracks [10; 11].

The present clinical case demonstrates that long-term preservation of natural teeth is achievable following endodontic retreatment even in initially unfavorable clinical conditions and supports attempting retreatment before deciding on tooth extraction.

CLINICAL CASE

A 54-year-old female patient presented with complaints of pain on biting and a sensation of pressure in the region of tooth No. 46, which had developed approximately three weeks earlier.

According to the patient's history, the tooth had been treated using the resorcinol-formaldehyde technique approximately 30 years previously. In 2000, she was diagnosed with a radicular cyst associated with tooth #46 (ICD-10 code K04.8). Radiographic records from the patient's medical history revealed a radiolucent lesion measuring 0.7×2.0 cm in the region of the roots

of teeth #46 and #47. Because the root canals were considered non-negotiable due to previous treatment with the resorcinol-formaldehyde technique, a tooth-preserving surgical procedure was performed. Following an unsuccessful attempt at nonsurgical retreatment, apicoectomy with cyst enucleation was carried out. The tooth remained asymptomatic for the subsequent 25 years. At the current visit, the patient expressed a strong desire to preserve the tooth. She denied any history of chronic systemic disease, infectious disorders, allergies, or regular medication use. Written informed consent was obtained before clinical examination.

Extraoral examination revealed a symmetrical face with normal skin coloration, no facial asymmetry or swelling, and unrestricted mouth opening. Intraoral examination demonstrated healthy oral mucosa without pathological lesions. The lips, buccal mucosa, hard palate, and soft palate appeared intact, moderately moist, and pale pink in color. Occlusion was physiological, with no abnormalities in tooth size or morphology. The vestibular fold adjacent to tooth #46 showed no swelling and was non-tender on palpation. Vertical percussion elicited mild tenderness, whereas horizontal percussion was negative. Clinical inspection revealed an existing restoration involving the occlusal and distal surfaces, fracture of the restoration on the mesial surface, and loss of marginal adaptation. A characteristic pink discoloration of the tooth, typical of previous resorcinol-formaldehyde treatment, was also observed (Fig. 1).

Cone-beam computed tomography (CBCT) demonstrated that tooth #46 had three root canals (distal, mesiolingual, and mesiobuccal), all of which were irregularly filled with root canal material terminating short of the radiographic apex. Widening of the periodontal ligament space was observed adjacent to the mesial root canals. The apical portion of the distal root exhibited a flat resected surface consistent with previous root-end resection (Fig. 2, 3).

Treatment plan

Based on the clinical findings and the patient's history, nonsurgical endodontic retreatment under magnification using a dental operating microscope was planned.

Treatment protocol

First visit

The defective restoration and recurrent carious tissue were removed. Stepwise removal of the previous root canal filling material was then performed using hand files in combination with Reciproc (VDW, Germany) nickel-titanium reciprocating instruments (Fig. 4).

Working length was determined using an electronic apex locator and subsequently confirmed radiographically with digital radiovisiography. The measured working lengths were 19 mm for the mesiobuccal canal, the mesiolingual canal, and 14 mm for the distal canal (Fig. 5).

Following removal of the previous filling material, mechanical canal preparation was completed to a final apical size of 60/.04 in the distal canal and 40/.04 in both mesial canals.



Fig. 1. Initial clinical presentation of tooth 4.6

Рис. 1. Исходная клиническая ситуация: зуб 4.6



Fig. 2. Initial clinical presentation: periapical radiovisiograph of tooth 4.6

Рис. 2. Исходная клиническая ситуация: радиовизиограмма зуба 4.6



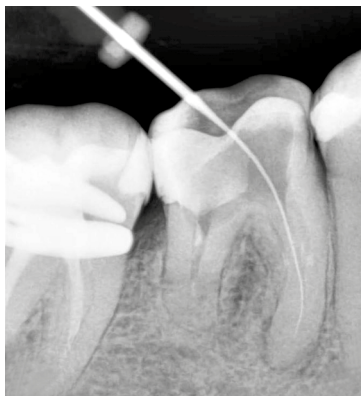
Fig. 3. Initial clinical presentation: cone-beam computed tomography of tooth 4.6, resected distal root, a radiolucent lesion measuring approximately 3–4 mm in diameter is visible, the root canals are partially (fragmentarily) filled with root canal filling material

Рис. 3. Исходная клиническая ситуация: конусно-лучевая компьютерная томография зуб 4.6, резецированный дистальный корень, радиолуцентный очаг диаметром до 3–4 мм, корневые каналы заполнены фрагментарно

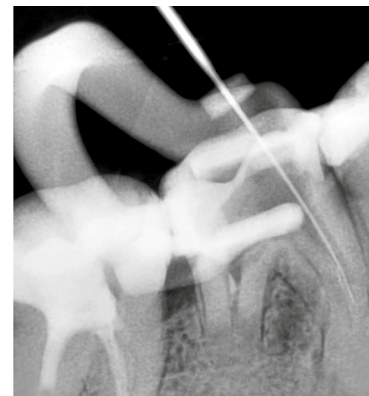


Fig. 4. Removal of the root canal filling material under a dental operating microscope

Рис. 4. Распломбирование корневых каналов с использованием дентального микроскопа



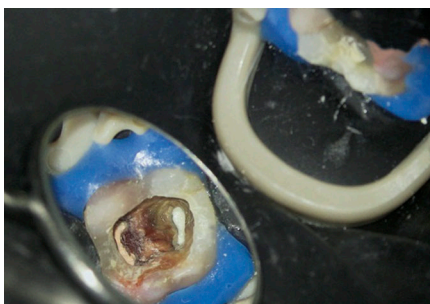
A



B

Fig. 5. Radiovisiograph showing working length determination of the mesiolingual (A) and mesiobuccal (B) root canal

Рис. 5. Радиовизиограмма: измерение рабочей длины медиально-язычного (A) и медиально-щечного (B) корневого канала



A



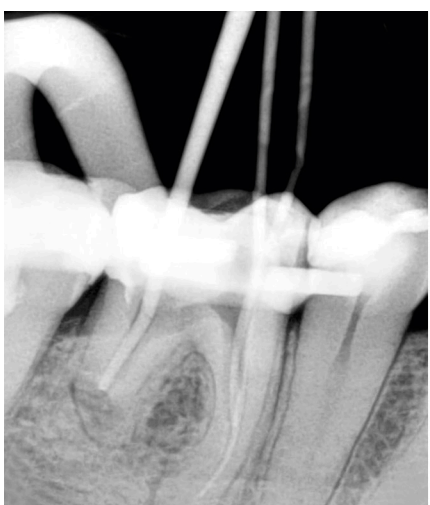
B



C

Fig. 6. Treatment stages: A – creation of an apical plug using MTA in the distal root canal; B – root canal obturation; C – restoration of tooth 4.6

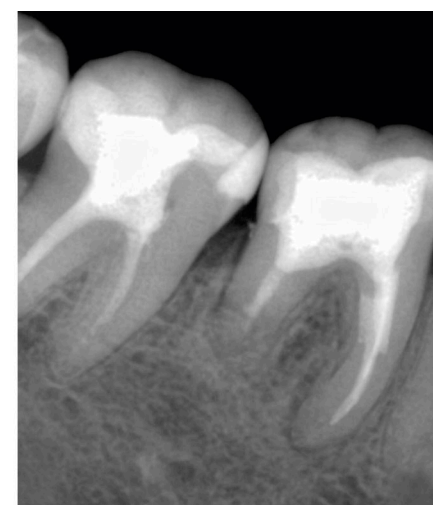
Рис. 6. Этапы лечения: А – создание апикальной пробки с помощью МТА на дистальном корневом канале; В – obturation корневых каналов; С – реставрация зуба 4.6



A



B



C

Fig. 7. Radiovisiographic image: A – trial fitting of master gutta-percha cones; B – after root canal obturation; C – after completion of treatment

Рис. 7. Радиовизиограмма: А – во время примерки мастер штифтов; В – после obturation корневых каналов; С – после завершения лечения

A comprehensive irrigation protocol was employed, consisting of 3.25% sodium hypochlorite (NaOCl) for dissolution of organic tissue and canal disinfection, followed by 17% ethylenediaminetetraacetic acid (EDTA) for removal of the inorganic smear layer and opening of the dentinal tubules.

To provide intracanal antimicrobial activity and prepare the canals for definitive obturation, a calcium hydroxide-based intracanal medicament was placed. The access cavity was then sealed with a temporary restoration. A follow-up appointment was scheduled 14 days later for clinical evaluation and definitive root canal obturation.

Second visit

At the second appointment, a follow-up clinical examination was performed. The vestibular fold adjacent to tooth № 46 showed no signs of swelling and was non-tender on palpation. Both vertical and horizontal percussion tests were negative, and the temporary restoration remained intact with an adequate coronal seal.

After removal of the temporary restoration and reassessment of the clinical condition, final root canal preparation was carried out. This included copious irrigation with ultrasonically activated irrigants, followed by a final rinse with 2% chlorhexidine solution.

To seal the enlarged apical foramen of the distal canal, an apical plug of mineral trioxide aggregate (MTA) was placed. To prevent extrusion of the material beyond the apex, a collagen sponge was first inserted to serve as an apical matrix. The MTA was mixed with distilled water to a putty-like consistency and delivered into the apical portion of the canal using an MTA plugger. The material was then gently condensed with gutta-percha points to create an apical plug measuring 3–5 mm in thickness (Fig. 6, A).

Master gutta-percha cones corresponding to the final apical preparation size were subsequently selected, and their position was verified radiographically (Fig. 7, A). Root canal obturation was then completed using the warm vertical compaction technique (Fig. 6, B).



Fig. 8. Cone-beam computed tomography one year after treatment

Рис. 8. Конусно-лучевая компьютерная томография через год после лечения

A postoperative radiograph was obtained to assess the quality of obturation. The radiograph demonstrated dense, homogeneous filling of all root canals throughout their entire length, with no visible voids or radiolucent defects (Fig. 7, B).

The coronal portion of the tooth was restored with a permanent direct restorative material, with careful adjustment of the occlusal contacts (Fig. 6, C and 7, C).

During follow-up, both clinical and radiographic findings indicated a stable outcome. The patient reported complete resolution of pain and discomfort during mastication. One year after treatment, CBCT demonstrated a marked reduction in the size of the periapical radiolucency together with substantial regeneration of the surrounding bone structure (Fig. 8).

DISCUSSION

The presented clinical case demonstrates the possibility of long-term preservation of a tooth with an initially unfavorable endodontic history, including treatment using the resorcinol-formalin method, development of a granuloma, subsequent apical root resection, and recurrence of apical periodontitis 25 years later. The key outcome was successful root canal retreatment using a dental operating microscope, modern irrigation protocols, and contemporary obturation techniques, which resulted in a reduction of the periapical lesion and bone tissue regeneration according to follow-up CBCT performed one year after treatment.

The resorcinol-formalin method, widely used two decades ago, is currently considered inconsistent with the principles of evidence-based dentistry. Its disadvantages, including cytotoxicity, incomplete root canal obturation, alteration of the physical and mechanical properties of dentin, ankylosis, and irreversible tooth discoloration, contribute to a high risk of exacerbation of chronic periodontitis, as well as functional and aesthetic complications. According to the literature, destructive changes in periapical tissues are detected in 70.8% of permanent teeth treated with this method, with chronic granulomatous periodontitis accounting for 34% of cases [1; 2]. In the present case, several years after the initial treatment (by 2000), the patient developed a bone rarefaction lesion measuring 0.7×2 cm, which is consistent with the high incidence of destructive complications reported in previous studies [1; 2; 8].

It is important to note that apical root resection performed in 2000 resulted in a 25-year period of asymptomatic clinical remission. This finding confirms the effectiveness of tooth-preserving surgical interventions as an alternative to tooth extraction, particularly in mandibular molars [4–6]. However, further follow-up demonstrated that the surgical procedure eliminated the consequence of infection but did not address its underlying cause – the infected contents of incompletely obturated root canals associated with the initial obstruction caused by resorcinol-formalin treatment. The expected outcome was recurrence of chronic periodontitis symptoms, including pain on biting and widening of the periodontal ligament space observed on CBCT [8]. This case illustrates a fundamental principle

emphasized by the authors: neglecting either of the two essential components – therapeutic elimination of infection within the root canal system or surgical removal of periapical pathology – results in incomplete treatment and reduces long-term success.

During repeated retreatment, modern endodontic technologies played a decisive role. The use of a dental operating microscope made it possible to overcome the challenges associated with canal obstruction caused by resorcinol-formalin paste. The stepwise irrigation protocol (3.25% NaOCl + 17% EDTA + ultrasonic activation) ensured dissolution of organic tissue remnants and removal of the smear layer [3; 7; 10; 11]. Temporary intracanal medication with calcium hydroxide provided additional antimicrobial activity. Particular attention should be given to the creation of an MTA apical plug in the distal canal with a wide apical opening resulting from previous root-end resection. This technique allowed reliable sealing of the open apex, prevented extrusion of the cement beyond the root apex, and created favorable conditions for subsequent vertical compaction of gutta-percha. The one-year follow-up CBCT findings, demonstrating reduction of the periapical lesion and restoration of bone structure, objectively confirm regeneration of the periapical tissues.

This case is consistent with published data demonstrating the effectiveness of retreatment of teeth previously subjected to surgical endodontic procedures [7]. It is important to emphasize that successful nonsurgical retreatment may be achieved even 25 years after apical root resection when all fundamental endodontic principles are followed, including adequate isolation, use

of an operating microscope, effective irrigation, and three-dimensional obturation. These findings provide additional support for attempting retreatment rather than proceeding directly to tooth extraction.

The present study represents a single case report; therefore, statistically supported conclusions cannot be drawn. The absence of histological confirmation of tissue characteristics before and after treatment limits the understanding of the precise mechanisms underlying regeneration [9]. In addition, no comparison was performed with alternative treatment approaches, such as repeat apical surgery or hemisection. Nevertheless, the extended follow-up period – 25 years after the initial surgical intervention and 1 year after retreatment – together with the use of an objective radiological assessment method (CBCT), increases the reliability and clinical significance of the presented findings.

CONCLUSION

The presented clinical case confirms that the resorcinol-formalin method creates conditions for persistent infection and the development of apical periodontitis; however, it should not be considered an absolute contraindication to tooth preservation. A personalized and comprehensive treatment approach represents the optimal strategy for achieving long-term success. The use of modern endodontic techniques enables effective retreatment even of “hopeless” teeth previously treated with outdated methods. The decision to extract a tooth should only be made after a comprehensive assessment of retreatment options and tooth-preserving surgical approaches.

REFERENCES / СПИСОК ЛИТЕРАТУРЫ

1. Brusnitsyna E.V., Zakirov T.V., Ioschenko E.S., Ozhgikhina N.V. Several aspects of use the resorcinol-formaldehyde resin. In: Dentistry of the Great Urals: Materials of the International Congress, Ekaterinburg, December 4–6, 2019. Ekaterinburg: Tirazh; 2020, pp. 13–15. (In Russ.) Available at: https://dental-press.ru/ru/nauka/conference_article/4012/view (accessed: 19.02.2026).
2. Nedzinskienė E., Pečiulienė V., Aleksejūnienė J., Manelienė R., Drukteinis S., Jakaitienė A. Potential to induce dentinal cracks during retreatment procedures of teeth treated with “Russian red”: An ex vivo study. *Medicina*. 2017;53(3):166–172. <https://doi.org/10.1016/j.medici.2017.05.005>
3. Korchagina M.S., Postnikov M.A., Burda G.K., Simanovskaya O.E., Rozhkova E.N., Ratnikova A.S. Analysis of modern methods of endodontic treatment of complicated caries according to the literature. *Journal of Volgograd State Medical University*. 2024;21(3):15–24. (In Russ.) <https://doi.org/10.19163/1994-9480-2024-21-3-15-24>
4. Semkin V.A., Nadtochiy A.G., Kuzin A.V., Kolotikov P.A. The effectiveness of tooth-preserving surgery in various forms of inflammatory and destructive lesions in mandibular molars area. *Stomatology*. 2019;98(2):60–63. (In Russ.) <https://doi.org/10.17116/stomat20199802160>
5. Ordashiev K.A., Kurbanova S.M., Gamzatova P.A., Dalgatova A.K., Agaragimov K.Z., Kadyrbekova S.M. et al. Periapical microsurgical endodontic treatment of the maxillary second premolar: a clinical case. *Endodontics Today*. 2025;23(4):692–696. <https://doi.org/10.36377/ET-0150>

Ордашев Х.А., Курбанова С.М., Гамзатова П.А., Далгатова А.К., Агагагимов К.З., Кадырбекова С.М. и др.

- Периапикальная микрохирургическая эндодонтия второго премоляра верхней челюсти: клинический случай. *Эндодонтия Today*. 2025;23(4):692–696. (На англ. яз.) <https://doi.org/10.36377/ET-0150>
6. Musienko A.I., Nesterova K.I., Mikhailovsky S.G., Musienko I.S., Lipatova A.V. Proprietary surgical approach to the treatment of large radicular cyst with retrograde filling of resected root canals: a clinical case report. *Parodontologiya*. 2024;29(4):465–471. (In Russ.) <https://doi.org/10.33925/1683-3759-2024-1018>
Мусяенко А.И., Нестерова К.И., Михайловский С.Г., Мусяенко И.С., Липатова А.В. Опыт хирургического лечения крупной радикулярной кисты с использованием авторской методики и ретроградным пломбированием резецированных корней зубов. *Пародонтология*. 2024;29(4):465–471. <https://doi.org/10.33925/1683-3759-2024-1018>
 7. Corbella S., Walter C., Tsesis I. Effectiveness of root resection techniques compared with root canal retreatment or apical surgery for the treatment of apical periodontitis and tooth survival: A systematic review. *Int Endod J*. 2023;56(S3):487–498. <https://doi.org/10.1111/iej.13808>
 8. Gulabivala K., Ng Y.L. Factors that affect the outcomes of root canal treatment and retreatment-A reframing of the principles. *Int Endod J*. 2023;56(S2):82–115. <https://doi.org/10.1111/iej.13897>
 9. Ricucci D., Rôças I.N., Hernández S., Siqueira J.F. Jr. “True” versus “Bay” apical cysts: clinical, radiographic, histopathologic, and histobacteriologic Features. *J Endod*. 2020;46(9):1217–1227. <https://doi.org/10.1016/j.joen.2020.05.025>
 10. Ivanova E.V., Sabantseva E.G., Korsakova E.V. The use of modern technologies and the machine system Reciproc (VDW) during the revision of the root canals of a tooth with apical periodontitis: a case report. *Endodontics Today*. 2023;21(4):299–304. (In Russ.) <https://doi.org/10.36377/1683-2981-2023-21-4-299-304>
Иванова Е.В., Сабанцева Е.Г., Корсакова Е.В. Применение современных технологий и машинной системы Reciproc (VDW) при проведении ревизии корневых каналов зуба с апикальным периодонтитом: клинический случай. *Эндодонтия Today*. 2023;21(4):299–304. <https://doi.org/10.36377/1683-2981-2023-21-4-299-304>
 11. Verma P., Narang A., Yadav S., Kharat N., Pandey T., Bhargava A. Comparison of efficiency of gutta percha removal in retreatment using Protaper retreatment files, Race instruments and Reciproc R: An in vitro study. *J Pharm Bioallied Sci*. 2025;17(Suppl. 3):S2253–S2255. https://doi.org/10.4103/jpbs.jpbs_967_25

INFORMATION ABOUT THE AUTHORS

Elena V. Krikun – Cand. Sci. (Med.), Associate Professor, Department of Therapeutic Dentistry, Kazan State Medical University, 49 Butlerova Str., Kazan 420012, Russian Federation; <https://orcid.org/0000-0002-5188-557X>

Svetlana L. Blashkova – Dr. Sci. (Med.), Professor, Head of the Department of Therapeutic Dentistry, Kazan State Medical University, 49 Butlerova Str., Kazan 420012, Russian Federation; <https://orcid.org/0000-0003-3233-2926>

Olga V. Budennaya – Dental Resident, Kazan State Medical University, 49 Butlerova Str., Kazan 420012, Russian Federation; <https://orcid.org/0009-0002-8896-5853>

Airat A. Salikhov – Dentist, Chief Physician, Vash Doktor Dental Practice LLC, 44A Adelya Kutuya Str., Kazan, Kazan 420073, Russian Federation

ИНФОРМАЦИЯ ОБ АВТОРАХ

Крикун Елена Валерьевна – к.м.н., доцент кафедры терапевтической стоматологии, ФГБОУ ВО «Казанский государственный медицинский университет», 420012, Российская Федерация, г. Казань, ул. Бутлерова, д. 49; <https://orcid.org/0000-0002-5188-557X>

Блашкова Светлана Львовна – д.м.н., профессор, заведующая кафедрой терапевтической стоматологии, ФГБОУ ВО «Казанский государственный медицинский университет», 420012, Российская Федерация, г. Казань, ул. Бутлерова, д. 49; <https://orcid.org/0000-0003-3233-2926>

Буденная Ольга Витальевна – ординатор, ФГБОУ ВО «Казанский государственный медицинский университет», 420012, Российская Федерация, г. Казань, ул. Бутлерова, д. 49; <https://orcid.org/0009-0002-8896-5853>

Салихов Айрат Ахатович – врач-стоматолог, главный врач клиники, ООО Стоматологическая практика «Ваш доктор», 420073, Российская Федерация, г. Казань, ул. Аделя Кутуя, д. 44А

AUTHOR'S CONTRIBUTION

All the authors made equal contributions to the publication preparation in terms of the idea and design of the article; data collection; critical revision of the article in terms of significant intellectual content and final approval of the version of the article for publication.

ВКЛАД АВТОРОВ

Все авторы внесли равноценный вклад в подготовку публикации в части замысла и дизайна исследования; сбора и анализа данных, проведения критического анализа интеллектуальной составляющей статьи и финального утверждения ее версии для публикации.