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Реферати

ОБГРУНТУВАННЯ БЕЗПЕЧНОГО ПРОМІЖКУ ЧАСУ ПРОВЕДЕННЯ САНАЦІЇ ПОРОЖНИНИ РОТА ПІД ЗАГАЛЬНИМ ЗНЕБОЛЕННЯМ У ДІТЕЙ ВІКОМ 12-18 РОКІВ

Коваль О. І.

В статті обгрунтовано безпечний проміжок часу проведення санації порожнини рота в амбулаторних умовах під загальним знеболенням у дітей віком 12-18 років з метою попередження виникнення когнітивних дисфункцій головного мозку на фоні гіпоксичних уражень. За результатами дослідження встановлено: з метою попередження виникнення гіпоксії головного мозку при проведенні стоматологічної санації порожнини рота в умовах загального знеболення (без інтубації) дітям віком від 12-ти до 18-ти років варто проводити в межах 60 ± 15 хв.; протипоказанням для планового проведення санації порожнини рота в умовах загального знеболення (без інтубації) є відсутність в анамнезі гострих респіраторних захворювань не менш ніж за 2 тижні; при наявності в анамнезі гострих респіраторних захворювань менш ніж за 2 тижні та гострою стоматологічною потребою, надання швидкої допомоги в умовах загального знеболення (без інтубації) можливо в межах ≤ 20 хв.

Ключові слова: церебральна оксиметрія, SpO₂, rSO₂, загальне знеболення.

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ОБОСНОВАНИЕ БЕЗОПАСНОГО ПРОМЕЖУТКА ВРЕМЕНИ ПРОВЕДЕНИЯ САНАЦИИ ПОЛОСТИ РТА ПОД ОБЩИМ ОБЕЗБОЛИВАНИЕМ У ДЕТЕЙ В ВОЗРАСТЕ 12-18 ЛЕТ

Коваль О. И.

В статье обоснован безопасный промежуток времени при проведении санации полости рта в амбулаторных условиях под общим обезболиванием у детей в возрасте 12-18 лет с целью предупреждения возникновения когнитивных дисфункций головного мозга на фоне гипоксических поражений. По результатам обследования установлено: с целью предупреждения возникновения гипоксии головного мозга стоматологическую санацию полости рта в условиях общего обезболивания (без интубации) детям в возрасте от 12-ти до 18-ти лет следует проводить в пределах 60 ± 15 мин. Противопоказанием для планового проведения санации полости рта в условиях общего обезболивания (без интубации) является отсутствие в анамнезе острых респираторных заболеваний не менее чем за 2 недели. При наличии в анамнезе острых респираторных заболеваний менее чем за 2 недели и острой стоматологической необходимости оказание скорой помощи в условиях общего обезболивания (без интубации) возможно в пределах ≤ 20 мин.

Ключевые слова: церебральная оксиметрия, SpO₂, rSO₂, общее обезболивание.

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APPLICATION OF NANOCRYSTALS IN TREATMENT OF CHRONIC APICAL PERIODONTITIS

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The use of nanocrystals for the treatment of chronic apical periodontitis is the current level of nanomedicine. We examined and treated 11 patients aged 17 to 67 years for aggravated and chronic apical periodontitis using the author's method of using phosphate buffer. An assessment of clinical and radiological data was carried out, which confirmed the process of restoration of periapical tissues in 11 patients. She showed that the regeneration of the apical and adjacent areas of the periodontal in 10 cases had a positive trend already after 29-30 days from the start of treatment; in 1 case the downward dynamics of recovery after 40 days from the start of treatment due to the presence of somatic pathology in the patient. The proposed method for the treatment of chronic apical periodontitis on the basis of the obtained treatment results requires further study in the long term with the aim of widespread implementation in practical dentistry.

Key words: treatment of chronic apical periodontitis, single crystals, phosphate buffer.

The work is a fragment of the research project "Application of modern technologies in diagnostics and treatment for rehabilitation of dental patients by orthopedic methods", state registration No. 0117U004778.

Nanomedicine, a novel branch of medicine, applies nanotechnological advances for the treatment of various diseases in dental patients with control of biological activity of the outcomes. Currently, for non-cellular strategy of tissue engineering in the treatment of apical periodontitis, application of nanocarriers is crucial [7, 12]. In endodontics, the diverse solutions, including 10%, 15%, 40% citric acid, are used at the stage of preparation of root canals by mechanical, instrumental and chemical removal of organic debris,

necrotic masses and dentin residues. Emphasizing one of the characteristic properties of citric acid in relation to its interaction with the hard tooth tissue, the study has established that the above reaction is the side-formation of $\text{Ca}_3(\text{C}_3\text{H}_5\text{O}_7)_2$ calcium citrate nanocrystals [5].

A similar process occurs during the filling of teeth with composite materials with preliminary phosphoric acid etching of enamel and dentin. Normally, phosphoric acid contributes to the formation of calcium phosphate, which is poorly soluble in water, or from a soluble state may become insoluble, i.e., the process depends on the state of chemical equilibrium [2, 8, 9, 11]. In this way, the donor of calcium ions is the own minerals of the hard tooth tissues [6]. Importantly, natural crystals of dentin and enamel contain calcium phosphate. As a result of chemical and physiological processes in the crown and root portions of the tooth, which are permeated with inter-prismatic spaces of the enamel and dentin tubules, a constant filling-up and circulation of calcium-rich cerebrospinal fluid occurs [3]. The latter, entering into reaction with phosphates, can form a characteristic biologically inert complex substance of calcium phosphate from the apex of the root to its crown [3, 12].

The density of the formed substance depends on a certain concentration of phosphate solution in the form of a buffer as a constant component of the pH level [6]. In the human body it is difficult to achieve the desired concentration of the above solution, since, as a result of physiological factors cerebrospinal fluid is constantly circulating in the root canal of the tooth leading to a certain inactivation of this solution [1, 4, 10]. Therefore, to reach such stability is possible only with the use of phosphate buffer. The method of preparation of the latter and the method of treatment are described in the declaration patent of Ukraine [6].

The search for novel non-toxic impregnation method continues to date, which makes the study relevant.

The purpose of the paper was at enhancement of the method of treatment of chronic apical periodontitis by obturation of the apex of the root using a white clay-based phosphate-buffered paste.

Materials and methods. 11 patients aged 17 to 67 years have been examined and received appropriate treatment for acute and chronic apical periodontitis according to the proposed technique. All patients were examined according to the traditional scheme; informed consents were obtained to be included in the experimental group. Additional examination involved radiological diagnostics before and after treatment, the duration of which was determined individually and dependant on the dynamics of individual treatment of the relevant clinical case within the time period of several days to several weeks. X-ray evaluation in both cases was performed by visual inspection under a magnifying glass of spot images, highlighting the dynamic changes of the periapical focus of destruction, which enlarged with exacerbation or diminished during the stabilization of the process.

The treatment technique included application of the proposed phosphate buffer, which was prepared (ex tempore) as follows: first, in a dental glass crucible, 13 drops of 15% solution of ammonium phosphate ($(\text{NH}_4)_3\text{PO}_4$) were mixed with 1 drop of phosphoric acid solution (37%, H_3PO_4), which is included in the set of any kit of materials for hard tooth tissues etching. The mixture, in the required amount, was transferred from the crucible to the dental glass using a plastic spatula and mixed with white clay (quantum satis) to form a paste of creamy consistency. Subsequently, properly prepared tooth should be isolated to avoid moisture of saliva and dried. Root canals, which, during the preparation of the tooth, could not be processed instrumentally, should be treated to the maximum possible length and expand their orifices cone-shaped. The obtained paste was injected to the enlarged orifices and into the root canal in a forcing manner using the root needle or canal filler. A temporary filling was made. The next visit was appointed following 24 hours or other time (at the discretion of a dentist). On the second visit, the temporary filling was removed. The paste was carefully removed from the cavity and root canal, washed with water and dried. Root canal filling can be performed with endodontic material according to the conventional technique or at the dentist's discretion and insulation gasket is placed. In periodontitis, the carious cavity was formed according to the requirements, and treatment was completed by filling the root canal and then the tooth cavity.

Results of the study and their discussion. All patients experienced reduction of the characteristic symptoms in the form of causal toothache when eating and unpleasant sensations of various kinds. In some cases, it was radiologically established that noticeable fibrotization and induration of destructive areas of the apical periodontium occurred at different times, starting from 2-3 days to several weeks.

In the approximate period of treatment, dental X-rays showed some clarification of the previously shadowed apical areas of the periodontium, and compaction of their contours around the perimeter of the focus of bone tissue destruction. In this case, along the perimeter of the pathological process, more distinct contours of differentiation of healthy and affected tissue were apparent.

For illustration, we report a case of treatment of the 65 year-old female patient K., who, at the first visit, was diagnosed with exacerbation of chronic apical periodontitis of tooth 45. Dental X-ray, presented in fig. 1a, shows a pronounced zone of bone tissue destruction in the form of a characteristic shadowing with blurred edges around the perimeter of the site of inflammation (marked with a line) in the area of the apex of the root. At the next visit, the patient almost had no complaints. Clinical examination showed a significant reduction in symptoms compared to the first visit.

Following 2 days after treatment the dental X-ray, presented in fig. 1b, showed compaction of the focus of destruction in the form of characteristic clarification in the form of certain islets of irregular shape and different shades. This heterogeneity of shades characterized the mineralization zones of cancellous bone tissue, localized in this area of the alveolar process. A detailed examination of the area at root apex revealed clarification of irregular form, which diffusely interspersed with adjacent tissues (marked with an arrow). We hypothesize that this is the vascular-nervous bundle of the central root canal. The latter is directly involved in the trophism of the tooth canal and periodontium by circulating calcium-rich dentinal cerebrospinal fluid. It is confirmed by the reaction of the latter with phosphate buffer, which leads to the corresponding mineralization of calcium phosphate formed in the specified area.

Certain features of positive dynamics (fig. 2) were observed in the treatment of chronic granulomatous periodontitis. For illustration, we report a clinical case of treatment of the 66 year-old male patient K., who, upon appropriate examination, was diagnosed with chronic granulomatous periodontitis of tooth 35. The dental X-ray, presented in fig. 2a, showed the oblong granuloma with shadowed edges (marked with an arrow) at the apex of the tooth root.

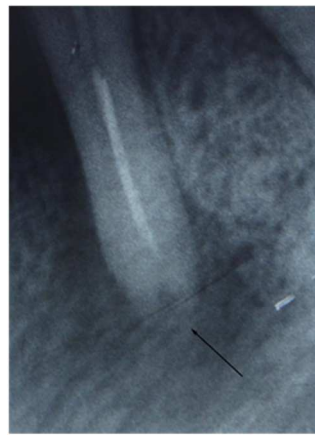
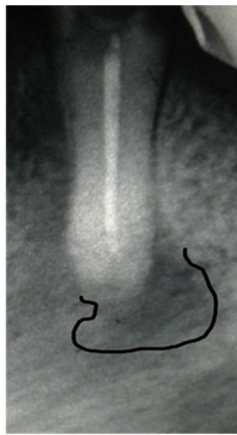


Fig. 1. Spot dental X-ray of tooth 45 of the 65 year-old female patient K. The state of the tooth before treatment (a). The state of the tooth following 2 days after treatment (b).

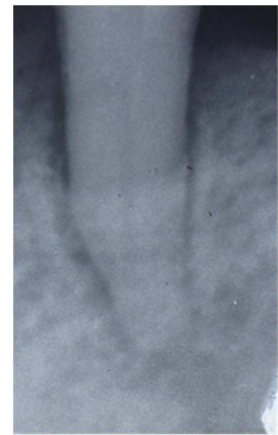
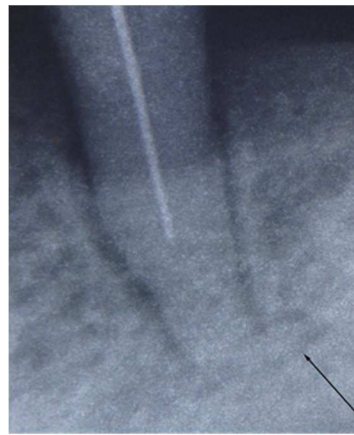


Fig. 2. Spot dental X-ray of tooth 35 of the 66 year-old male patient K. The state of the tooth before treatment (a). The state of the tooth following 4 days after treatment (b).

Periodontal fissure on both sides of the root is enlarged and has shadowed contours in the form of a dotted strip. The dental X-ray, presented in fig. 2b, showed that granuloma lost its contours following 4 days after treatment and an induration in the form of a characteristic clarification of the tissues at the apex of the root and periodontal fissure was noted. The latter almost lost its dottedness and was mineralized on both sides of the tooth root.



Fig. 3. The 52 year-old male patient T. Image of the maxillary central incisors at the stage of clinical examination (3a). Spot dental X-ray of both maxillary central incisors at the stage of clinical examination (3b).

The clinical case (fig. 3) of the intermediate stage of treatment of tooth 21 of the 52 year-old male patient T., who was diagnosed with chronic granulomatous periodontitis 21, Class I tooth mobility, is of special attention.

Tooth 21 has not been treated for more than 30 years after acute mechanical injury. Current X-ray examination of another central incisor revealed crack in the root, though the tooth has physiological mobility.

A detailed study of the spot dental X-ray of tooth 21 (fig. 4a) revealed a significant area of bone destruction in the area of the root apex within 3.9 mm (marked with horizontal arrows). The structure of the dentin of the latter has largely lost its density in the form of a characteristic shadowing without clear

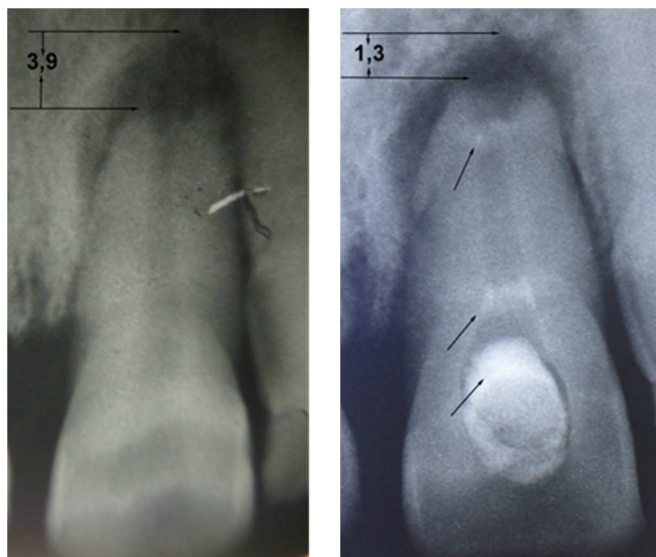


Fig. 4. Spot dental X-ray of tooth 21 of the 52 year-old male patient T. The state of the tooth before treatment (a). The state of the tooth following 15 days after treatment (b).

boundaries. The periodontal fissure is enlarged on both sides of the root in the form of a clearly defined dark stripe, which from the distal side of the root reaches the neck of the tooth.

The dental X-ray of the tooth following 15 days after treatment is presented on Fig. 4b. The study revealed diminishing of the shadowed area at the apex of the root to 1.3 mm (marked with horizontal arrows) and a clearer dissociation from the bone tissue, which indicates a positive process of mineralization of the latter. The active zones of mineralization were clearly distinguished in the thickness of the root dentin in the form of clear X-ray contrast bands of different widths at the apex and orifice of the canal (marked with diagonal arrows). The phosphate-buffered paste contrasted especially

clearly in the tooth cavity. The different degree of contrast of the above active zones of mineralization, in our opinion, indicated a different degree of presence of dentinal cerebrospinal fluid in the tubules, which in their histological structure are more open towards the central canal of these zones. During the treatment period the anatomical apex of the root also acquired a characteristic clear shape, and its surface had light and clear boundaries. The periodontal fissure became smaller and lighter due to mineralization. However, clinically, the mobility of the tooth has not changed.

Conclusion

The analysis of the clinical and radiological data of the regeneration process of periapical tissue during treatment of patients with chronic apical periodontitis has shown positive dynamics of regeneration of the apical and adjacent areas of the periodontium in all cases. The effectiveness of the developed treatment technique of above patients was confirmed by the results of clinical examinations and radiological methods of study. Thus, the proposed method of treatment of chronic apical periodontitis on the basis of approximate results of treatment requires further study in the long term to be widely implemented in practical dentistry.

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Реферати

**ЗАСТОСУВАННЯ НАНОКРИСТАЛІВ
ДЛЯ ЛІКУВАННЯ ХРОНІЧНОГО
ВЕРХІВКОВОГО ПЕРІОДОНТИТУ**Костиренко О.П., Мельник В.Л., Шевченко В.К.,
Силенко Ю.І., Єрошенко Г.А.

Застосування нанокристалів для лікування хронічного верхівкового періодонтиту – сучасний рівень наномедицини. Нами обстежено та проліковано 11 хворих віком від 17 до 67 років на загострений та хронічний верхівковий періодонтит за допомогою авторської методики з використанням фосфатного буферу. Проведена оцінка клінічних та рентгенологічних даних підтвердила процес відновлення периапікальних тканин у 11 пацієнтів. Вона показала, що регенерація верхівкових та прилеглих до них ділянок періодонту в 10 випадках мали позитивну динаміку вже через 29-30 днів від початку лікування; у 1 випадку – відмічена сповільнена динаміка відновлення через 40 днів від початку лікування через наявність у пацієнта соматичної патології. Запропонований спосіб лікування хронічного верхівкового періодонтиту на підставі отриманих результатів лікування потребує подальшого вивчення у віддалені терміни з метою широкого впровадження в практичну стоматологію.

Ключові слова: лікування хронічного верхівкового періодонтиту, монокристали, фосфатний буфер.

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**ПРИМЕНЕНИЕ НАНОКРИСТАЛЛОВ
ДЛЯ ЛЕЧЕНИЯ ХРОНИЧЕСКОГО
ВЕРХУШЕЧНОГО ПЕРИОДОНТИТА**Костыренко А.П., Мельник В.Л., Шевченко В.К.,
Силенко Ю.И., Ерошенко Г.А.

Применение нанокристаллов для лечения хронического верхушечного периодонтита - современный уровень наномедицины. Нами обследовано и пролечено 11 больных в возрасте от 17 до 67 лет на обострившийся и хронический верхушечный периодонтит с помощью авторской методики использования фосфатного буфера. Проведена оценка клинических и рентгенологических данных, которые подтвердили процесс восстановления периапикальных тканей у 11 пациентов. Она показала, что регенерация верхушечных и прилегающих к ним участков периодонта в 10 случаях имели положительную динамику уже через 29-30 дней от начала лечения; в 1 случае - отмечена замедленная динамика восстановления через 40 дней от начала лечения из-за наличия у пациента соматической патологии. Предложенный способ лечения хронического верхушечного периодонтита на основании полученных результатов лечения требует дальнейшего изучения в отдаленные сроки с целью широкого внедрения в практическую стоматологию.

Ключевые слова: лечение хронического верхушечного периодонтита, монокристаллы, фосфатный буфер.

Рецензент Аветиков Д.С.

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V.G. Lizogub, V.N. Kramarova, L.N. Polonska, T. M. Kaminska, I.O. Melnychuk, Y.V. Tyravska
O.O. Bogomolets National Medical University, Kyiv**DIETARY CORRECTION OF HYPERINSULINEMIA AND HEMOSTASIS PARAMETERS
IN OVERWEIGHT ARTERIAL HYPERTENSION PATIENTS**

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The purpose of our study was to investigate the influence of a carbohydrate-restricted diet up to 250 g per day for 12 weeks on body mass index, insulin level, and parameters of hemostasis in patients with arterial hypertension and metabolic disorders. It was registered the decrease in the body mass index by 7%, insulin level by 27.8%, factor von Willebrand activity ($p=0.009$) and soluble fibrin content ($p=0.03$) and the improvement of the platelet aggregation induced by ADP and ristocetin in patients with arterial hypertension and increased body mass index who followed the diet with carbohydrate restriction up to 250 g per day for 12 weeks in addition to standard therapy. A diet with carbohydrate restriction up to 250 g per day should be recommended to the patients with combination of arterial hypertension, increased body mass index and hyperinsulinemia in addition to antihypertensive therapy.

Key words: arterial hypertension, carbohydrate-restricted diet, body mass index, insulin level, hemostasis parameters.

The study is a fragment of the research project "Hemodynamic and coronary blood supply disturbances and ectopic myocardial activity in patients with ischemic heart disease and diabetes mellitus, methods of correction", state registration No. 0117U006000.

The scientific debate concerning optimal management of patients with arterial hypertension (AH) is still open despite effective recommendations for lifestyle modification and medicines [1]. This is connected predominantly with high incidence of complications associated with AH, notably stroke and cardiovascular diseases [2]. Furthermore, risk of complications increases drastically in patients with metabolic disorders [3]. For instance, it was reported a 2-fold increase in cardiovascular outcomes and 1.5-fold increase in all-cause mortality [2].

Variety methods for correction of metabolic dysfunction and associated disorders exist [4]. The effectiveness of carbohydrate-restricted diets was showed in numerous studies [5]. However, the data of carbohydrate-restricted diets impact on hemostasis is still insufficient, although the crucial role of the latter in pathogenesis of AH complications and metabolic disorders is undoubted [6].

In our study we investigated parameters of vascular hemostasis and coagulation in patients with basic treatment and additional carbohydrate-restricted diet.