

TOOTH ROOT CRACK

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One of the most difficult cases that a dentist may encounter is the detection of a root crack, which may present difficulties in diagnosis and further treatment. There are several clinical and radiological signs on the basis of which the clinician may suspect this type of pathology.

The prognosis of treatment depends on many concomitant factors. For example, incomplete vertical fractures, cracks in the roots of teeth occur under the influence of a strong chewing load, trauma, as well as during the fixation of pins or tabs for tooth extensions. It is possible to detect a crack only with a thorough examination of the tooth using a magnifying glass or microscope. After a few months or years, cracks can turn into a complete vertical fracture, which will lead to undesirable consequences. It should be borne in mind that through the formed defect there is a constant seepage of microorganisms leading to resorption of bone tissue, which in the future can significantly complicate or make it impossible to install an implant.

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In clinical practice, vertical cracks of the tooth root are most often found. The largest percentage of root cracks occurs in teeth that have previously undergone endodontic treatment. But sometimes they also occur in an intact, previously untreated tooth. The crack can pass through either one or both walls of the root. For example, in molars, the crack/fracture line most often follows in the buccal-lingual direction. The mesio-distal direction is less common. In the area of the front teeth, it is more often located in the buccal-lingual direction. The crack can originate from both the crown and the apex.



Vertical root cracks

This type represents longitudinally oriented cracks passing through the root wall, penetrating from the root canal into the periodontal pathology. A vertical crack may occur during treatment, in the postoperative period, or due to injury.

The diagnosis of cracks is often complicated, because there are no clinical signs indicating their presence. A fiber-optic light source and the use of a dye are valuable auxiliary tools for evaluating the crack line.

Possible causes of tooth root crack formation

1. Fixing the pin structure (during or after the procedure):

- the diameter of the pin is unacceptably larger than the diameter of the channel;
- excessive thinning of the root walls;
- deviation from the axis of the root canal during the preparation process.

For example, after fixing the pin structure, as a result of the redistribution of chewing pressure from the crown to the root through the pin, there is a danger of cracking and splitting the root.

*modern research has confirmed that only elastic, namely carbon and fiberglass, pins made with the help of modern technologies have physical properties similar to the tooth structure and can create a reliable structure.

2. Endodontic treatment:

- excessive pressure when using spreaders and pluggers during endodontic treatment;
- condensation of gutta-percha pins;
- excessive expansion of the channel in the middle third, on the inner curvature of the root;
- discrepancy in the selection of the dimension of the endodontic instrument in

relation to the root canal of the tooth;

3. Injury:

- careless extraction of teeth;
- domestic injury, etc.

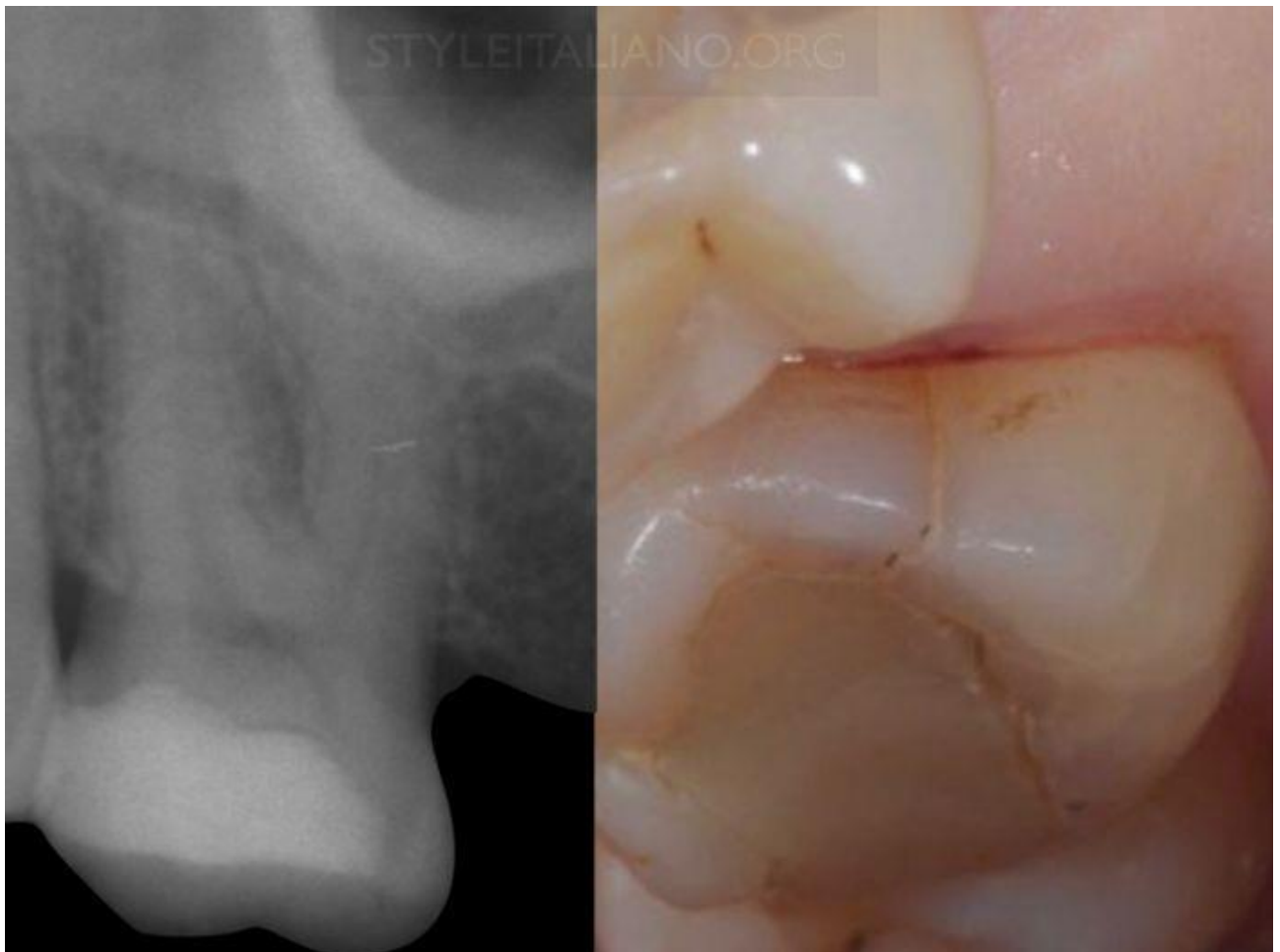
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Clinical manifestations of a tooth root crack

The clinical manifestations of cracks in the roots of teeth have different symptoms, and the symptoms vary depending on:

- crack localization;
- like a tooth;
- the time that has passed since the crack appeared;
- the state of the periodontium and the architecture of the bone adjacent to the fracture gap.



I. Teeth with vertical root cracks often have a history of prolonged discomfort or soreness, usually a local focus of chronic infection is detected nearby. Usually the pain

is moderate or moderate, there is pain when biting. The patient complains of pain when chewing, any stress on a previously treated tooth, an unpleasant taste, and a feeling of discomfort. Sometimes the patient remembers the feeling of a "click" during condensation of gutta-percha or pin fixation. In this case, it is possible to suspect the possibility of a crack in the root area of the causal tooth.

Ii. Bleeding during condensation, a clear drop in the resistance of the root walls lead to the fact that a large amount of gutta-percha can be injected into the canal, which may indicate the presence of a crack /fracture.

Iii. In the oral cavity in the area of the causal tooth, you can see a slight swelling of the soft tissues. The swelling is usually diffuse and is projected in the area of the middle third of the root. Palpation reveals swelling and tension along the length of the root with little involvement in the periapical region.

In the presence of a fistula, the latter is more often located near the dentoalveolar junction than in the apex area. It is often possible to detect two or more fistulas. Moreover, they may be at some distance from the causal tooth. The introduction of gutta-percha pins into each of the fistula passages facilitates diagnosis.

Iv. A characteristic feature of vertical root cracks is the formation of deep, narrow, isolated periodontal pockets. Usually the pocket is located on the side of the crack. If the crack is through, pockets can be identified from two sides. The results of probing teeth with vertical cracks differ from those in the examination of teeth with periodontal disease. In the latter case, a clear pocket is determined that captures a significant part of the perimeter of the tooth (fig.).

A deep narrow pocket in one section of the circular ligament, in the presence of normal attachment in the rest of the gum area, indicates a vertical crack of the tooth

V. Deep probing in one area, in the presence of an otherwise normal gingival attachment, usually indicates a vertical crack in the root of the tooth. If there are two pockets with normal gum attachment, then this is reliable evidence of a vertical root crack.

For example, when examining a tooth, a single deep narrow pocket can be found on the vestibular side in the presence of normal gingival attachment. The presence of a vertical crack in most cases is confirmed after tooth extraction.

Vi. Deep pockets in two sites located opposite each other are pathognomonic for a vertical crack. Sometimes it may be necessary to remove the restoration before probing the depth of the pocket in the interproximal sections of molars with mesio-distal crack/fracture lines.

Vii. A common sign of a complete crack is the mobility of the pins and pin teeth. This fact should be suspected if the carefully fitted pin became movable, the patient paid attention to the mobility of the structure and unpleasant or painful sensations. On examination, movable root walls are revealed.

Viii. The presence of a crack should be suspected in teeth with a history of repeated cementation of pin structures. Due to problems in diagnosis, it is not uncommon for such teeth to undergo repeated surgical treatment before a vertical root crack is suspected.

X-ray examination

In most cases, cracks on the x-ray are not visible, because they are most often located in the mesio-distal direction and do not fall into the plane of x-rays. You can see the crack on the x-ray image depending on:

- the angle of the x-ray beam relative to the plane of the crack/fracture;
- the time that has elapsed since the formation of the defect;
- the degree of discrepancy of the fragments.

Sometimes a direct sign of a crack is a vertical line passing through a canal or root seal. It is often quite difficult to discern direct evidence of a root fracture. In order for it to be visible, the x-ray beam must pass strictly through the plane of the fracture. The slightest changes in the horizontal angle can cause the crack to become invisible. Four images with different values of the horizontal angle can help in visualizing the crack. It is believed that cracks deviating from the axis of the channel are more noticeable than cracks following in parallel and layered on the root seal. It should be borne in mind that if a clear image of a crack is visible on the x-ray, you need to be wary when trying to identify a vertical line as a fracture line!

Tooth 2.1.

The fracture line (shown by the arrow) appears to run parallel to the canal, then deviate distally in the apical third

As a result of a longitudinal crack along the root of the tooth (mesial and distal root of the upper molar or the roots of the molars of the lower jaw), bone destruction can be visualized on an x-ray image along the entire perimeter of the tooth root in the form of a "tick" narrowing in the apex area. Diffuse bone loss of this type within one root or one tooth is pathognomonic for vertical root fracture.

A destructive process in the area of bifurcation of the chewing group of the mandible teeth is possible in patients without obvious periodontal diseases in situations where bacterial penetration occurs through bifurcation defects, such as perforations, cracks. If destruction occurs in the bifurcation area for no apparent reason and without any obvious signs of periodontal pathology, the presence of a longitudinal defect passing through the bifurcation should be suspected. On the lower teeth, the loss of bone tissue in the bifurcation area is usually clearly visible. However, in the area of the upper molars, it is usually hidden due to the position of the palatine root. In this case, an x-ray in an oblique projection is necessary to visualize the bone defect.

It should be borne in mind that in the presence of a defect in the form of a tooth

root crack, a microcommunication with adjacent periodontal tissues is formed. Because of this, there is direct contact between bacteria and their accompanying irritants, which can cause local destruction of the periodontium and loss of bone adjacent to the crack of the tooth root. The degree of destruction depends on the type of defect and the time of its existence. The radiological manifestations of bone loss depend on the extent of the destruction zone and the time of this process.

Treatment

If the clinician has confirmed the presence of a tooth root crack, it is necessary to make an adequate decision regarding subsequent treatment. In such cases, the discomfort associated with such cracks is often not acute, and patients endure it for years. Some refuse to remove the causal tooth. Nevertheless, it must be remembered that as long as there is such a defect, bone destruction continues and will continue as long as the affected tooth remains in the dentition. Therefore, the pathological process associated with the destruction of bone tissue may limit the patient's choice of treatment tactics. Thus, it is recommended to remove a tooth with a vertical crack as soon as it becomes appropriate.

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Multi-root teeth can be successfully treated by resection of the affected root, amputation or hemisection. For lateral teeth, the prognosis is good, provided that the crack is completely eliminated. The results of the study of teeth with resected roots report 5-year dental preservation in 94% of cases and 10-year dental preservation in 68% of cases. For single-root teeth, the prognosis is generally unfavorable, and tooth extraction is often required.

List of used literature:

1. Asrorovna, X. N., Baxriddinovich, T. A., Bustanovna, I. N., Valijon O'g'li, D. S., & Qizi, T. K. F. (2021). Clinical Application Of Dental Photography By A Dentist. *The American Journal of Medical Sciences and Pharmaceutical Research*, 3(09), 10-13.
2. Ugli, A. A. A., & Bustanovna, I. N. (2024). STUDY OF THE CONDITION OF PARODONT IN PERIODONTITIS IN FETAL WOMEN. *European International Journal of Multidisciplinary Research and Management Studies*, 4(05), 149-156.
3. Kizi, J. O. A., & Bustanovna, I. N. (2024). FAMILIARIZATION WITH THE HYGIENIC ASSESSMENT OF THE CONDITION OF THE ORAL MUCOSA IN ORTHOPEDIC TREATMENT. *European International Journal of Multidisciplinary Research and Management Studies*, 4(05), 89-96.
4. Bustanovna, I. N. (2024). Determination of the Effectiveness of Dental Measures for the Prevention of Periodontal Dental Diseases in Workers of the Production of Metal Structures. *International Journal of Scientific Trends*, 3(5), 108-114.

5. Bustanovna, I. N. (2022). Assessment of clinical and morphological changes in the oral organs and tissues in post-menopause women. *Thematics Journal of Education*, 7(3).
6. Bustanovna, I. N., & Berdiqulovich, N. A. (2022). ПРОФИЛАКТИКА И ЛЕЧЕНИЯ КАРИЕСА У ПОСТОЯННЫХ ЗУБОВ. *JOURNAL OF BIOMEDICINE AND PRACTICE*, 7(1).
7. Bustanovna, I. N. (2024). PATHOGENESIS OF PERIODONTAL DISEASE IN ELDERLY WOMEN. *Лучшие интеллектуальные исследования*, 21(3), 25-29.
8. Bustanovna, I. N. (2024). TO STUDY THE HYGIENIC ASSESSMENT OF THE CONDITION OF THE ORAL MUCOSA DURING ORTHOPEDIC TREATMENT. *Лучшие интеллектуальные исследования*, 21(1), 9-15.
9. Bustanovna, I. N. (2024). CLINICAL AND LABORATORY CHANGES IN PERIODONTITIS. *Journal of new century innovations*, 51(2), 58-65.
10. Bustanovna, I. N. (2024). Morphological Changes in Oral Organs and Tissues in Women after Menopause and their Analysis. *International Journal of Scientific Trends*, 3(3), 87-93.
11. Bustanovna, I. N. (2024). Hygienic Assessment of The Condition of The Oral Mucosa After Orthopedic Treatment. *International Journal of Scientific Trends*, 3(3), 56-61.
12. Bustanovna, P. I. N. (2024). Further Research the Features of the Use of Metal-Ceramic Structures in Anomalies of Development and Position of Teeth. *International Journal of Scientific Trends*, 3(3), 67-71.
13. Bustanovna, I. N. (2024). The Effectiveness of the Use of the Drug " Proroot MTA" in the Therapeutic and Surgical Treatment of Periodontitis. *International Journal of Scientific Trends*, 3(3), 72-75.
14. Bustanovna, P. I. N. (2024). Research of the Structure of Somatic Pathology in Patients with Aphthous Stomatitis. *International Journal of Scientific Trends*, 3(3), 51-55.
15. Bustanovna, I. N., & Abdusattor o'g, A. A. A. (2024). Analysis of Errors and Complications in the Use of Endocal Structures Used in Dentistry. *International Journal of Scientific Trends*, 3(3), 82-86.
16. Bustanovna, I. N. (2024). Complications Arising in the Oral Cavity after Polychemotherapy in Patients with Hemablastoses. *International Journal of Scientific Trends*, 3(3), 62-66.
17. Bustanovna, I. N., & Sharipovna, N. N. (2023). Research cases in women after menopause clinical and morphological changes in oral organs and their analysis. *Journal of biomedicine and practice*, 8(3).
18. Bustonovna, I. N., & Sharipovna, N. N. (2023). Essential Factors Of Etiopathogenesis In The Development Of Parodontal Diseases In Post-Menopasis Women. *Eurasian Medical Research Periodical*, 20, 64-69.
19. Fakhridin, C. H. A. K. K. A. N. O. V., Shokhruh, S. A. M. A. D. O. V., & Nilufar, I. S. L. A. M. O. V. A. (2022). ENDOKANAL PIN-KONSTRUKSIYALARNI ISHLATISHDA ASORATLAR VA XATOLAR TAHLILI. *JOURNAL OF BIOMEDICINE AND PRACTICE*, 7(1).

20. Очилов, Х. У., & Исламова, Н. Б. (2024). Особенности артикуляции и окклюзии зубных рядов у пациентов с генерализованной формой повышенного стирания. SAMARALI TA'LIM VA BARQAROR INNOVATSIYALAR JURNALI, 2(4), 422-430.
21. Ortikova, N., & Rizaev, J. (2021, May). The Prevalence And Reasons Of Stomatophobia In Children. In E-Conference Globe (pp. 339-341).
22. Ortikova, N. (2023). ANALYSIS OF ANESTHESIA METHODS FOR DENTAL FEAR AND ANXIETY. Центральноеазиатский журнал академических исследований, 1(1), 8-12.
23. Ortikova, N. K. (2023). DENTAL ANXIETY AS A SPECIAL PLACE IN SCIENTIFIC KNOWLEDGE. SCHOLAR, 1(29), 104-112.
24. Исламова, Н. Б. (2024). ПАРОДОНТ КАСАЛЛИКЛАРИДА ОРГАНИЗМДАГИ УМУМИЙ ЎЗГАРИШЛАРНИ ТАҲЛИЛИ ВА ДАВОЛАШ САМАРАДОРЛИГИНИ ТАКОМИЛЛАШТИРИШ. ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ, 43(7), 18-22.
25. Islamova, N. B., & Chakkonov, F. K. (2021). Changes in the tissues and organs of the mouth in endocrine diseases. Current Issues in Dentistry, 320-326.
26. Исламова, Н. Б., & Исломов, Л. Б. (2021). Особенности развития и течения заболеваний полости рта при эндокринной патологии. ББК, 56, 76.
27. Исламова, Н. Б., & Назарова, Н. Ш. (2023). СУРУНКАЛИ ТАРҚАЛГАН ПАРОДОНТИТ БИЛАН КАСАЛЛАНГАН ПОСТМЕНОПАУЗА ДАВРИДАГИ АЁЛЛАРНИНГ ПАРОДОНТ ТЎҚИМАСИНИНГ ДАВОЛАШ САМАРАДОРЛИГИ ОШИРИШ. ЖУРНАЛ СТОМАТОЛОГИИ И КРАНИОФАЦИАЛЬНЫХ ИССЛЕДОВАНИЙ, 4(2).
28. Исламова, Н. Б. (2024). ПАРОДОНТИТ КАСАЛЛИГИДА ОРГАНИЗМДАГИ УМУМИЙ ВА МАҲАЛЛИЙ ЎЗГАРГАН КЎРСАТКИЧЛАРНИНГ ТАҲЛИЛИ. Журнал гуманитарных и естественных наук, (8), 23-27.
29. Islamova, N. B., & Sh, N. N. (2023, May). STUDY OF CHANGES IN PERIODONTAL DISEASES IN POSTMENOPAUSAL WOMEN. In Conferences (pp. 15-17).
30. Исламова, Н. Б., & Назарова, Н. Ш. (2023, May). Совершенствование диагностики и лечения хронического генерализованного пародонтита у женщин в период постменопаузы. In Conferences (pp. 13-15).
31. Islamova, N. B., & Nazarova, N. S. (2023). IMPROVING THE DIAGNOSIS AND TREATMENT OF CHRONIC GENERALIZED PERIODONTITIS IN POSTMENOPAUSAL WOMEN. Conferences.
32. Исламова, Н. Б. (2023). Гемодинамика тканей пародонта зубов по данным реопародонтографии.
33. Исламова, Н. Б., & Назарова, Н. Ш. (2023). МЕТОДЫ ИССЛЕДОВАНИЯ ЗАБОЛЕВАНИЙ ПАРОДОНТА У ЖЕНЩИН, НАХОДЯЩИХСЯ В ПЕРИОДЕ ПОСТМЕНОПАУЗЫ. In АКТУАЛЬНЫЕ ВОПРОСЫ СТОМАТОЛОГИИ (pp. 334-338).

34. Исламова, Н. Б. (2024). Complications Arising in the Oral Cavity after Polychemotherapy in Patients with Hemablastosis. *International Journal of Scientific Trends*, 3(3), 76-81.
35. Islamova, N. B. (2022). CHANGES IN PERIODONTAL TISSUES IN THE POSTMENOPAUSAL PERIOD. In *Стоматология-наука и практика, перспективы развития* (pp. 240-241).
36. Назарова, Н., & Исламова, Н. (2022). Этиопатогенетические факторы развития заболеваний пародонта у женщин в периоде постменопаузы. *Профилактическая медицина и здоровье*, 1(1), 55-63.
37. Иргашев, Ш. Х., & Исламова, Н. Б. (2021). Применение и эффективность энтеросгеля при лечении генерализованного пародонтита. In *Актуальные вопросы стоматологии* (pp. 305-310).
38. Иргашев, Ш., Норбутаев, А., & Исламова, Н. (2020). Эффективность энтеросгеля при лечении генерализованного пародонтита у ликвидаторов последствий аварии на чернойбыльской АЭС. *Общество и инновации*, 1(1/S), 656-663.
39. Исламова, Н. Б. (2016). Сравнительная оценка противовоспалительных цитокинов крови в развитии заболеваний полости рта при гипотиреозе. *Наука в современном мире: теория и практика*, (1), 41-44.
40. Исламова, Н. Б., Шамсиев, Р. А., Шомуродова, Х. Р., & Ахмедова, Ф. А. (2014). Состояние кристаллообразующей функции слюны при различных патологиях. In *Молодежь и медицинская наука в XXI веке* (pp. 470-471).
41. Исламова, Н., & Чакконов, Ф. (2020). Роль продуктов перекисного окисления липидов и противовоспалительных цитокинов крови в развитии заболеваний полости рта при гипотиреозе. *Общество и инновации*, 1(1/s), 577-582.
42. Исламова, Н., Хаджиметов, А., & Шакиров, Ш. (2015). Роль продуктов перекисного окисления липидов и противовоспалительных цитокинов крови в развитии заболеваний полости рта при гипотиреозе. *Журнал проблемы биологии и медицины*, (1 (82)), 41-44.
43. Исламова, Н. Б., & Чакконов, Ф. Х. (2021). Изменения в тканях и органах рта при эндокринных заболеваниях. In *Актуальные вопросы стоматологии* (pp. 320-326).
44. Nazarova, N. S., & Islomova, N. B. (2022). postmenopauza davridagi ayollarda stomatologik kasalliklarining klinik va mikrobiologik ko'rsatmalari va mexanizmlari. *Журнал "Медицина и инновации"*, (2), 204-211.
45. Nazarova, N. S., & Islomova, N. B. (2022). postmenopauza davridagi ayollarda stomatologik kasalliklarining klinik va mikrobiologik ko'rsatmalari va mexanizmlari. *Журнал "Медицина и инновации"*, (2), 204-211.
46. Sulaymonova, Z. Z., & Islamova, N. B. (2023, May). TAKING IMPRESSIONS IN THE ORAL CAVITY AND THEIR REDUCTION. In *Conferences* (pp. 21-23).
47. Sharipovna, N. N., & Bustonovna, I. N. (2022). Etiopatogenetic factors in the development of parodontal diseases in post-menopasis women. *The american journal of medical sciences and pharmaceutical research*, 4(09).

48. Sarimsokovich, G. M. (2023). LATEST METHODS OF STUDY OF PERIODONTAL DISEASE IN WOMEN. *European International Journal of Multidisciplinary Research and Management Studies*, 3(10), 242-250.
49. DENTAL PROSTHETICS. Лучшие интеллектуальные исследования, 18(4), 31-35.
50. Содикова, Ш. А., & Исламова, Н. Б. (2021). Оптимизация лечебно-профилактических мероприятий при заболеваниях пародонта беременных женщин с железодефицитной анемией. In *Актуальные вопросы стоматологии* (pp. 434-440).
51. Чакконов, Ф. Х. (2021). ЯТРОГЕННЫЕ ОШИБКИ В СТОМАТОЛОГИИ И ИХ ПРИЧИНЫ. In *Актуальные вопросы стоматологии* (pp. 925-930).
52. ЧАККОНОВ, Ф., САМАДОВ, Ш., & ИСЛАМОВА, Н. (2022). ENDOKANAL PIN-KONSTRUKSIYALARNI ISHLATISHDA ASORATLAR VA XATOLAR TAHLILI. *ЖУРНАЛ БИОМЕДИЦИНЫ И ПРАКТИКИ*, 7(1).
53. Xusanovich, C. F., Orzimurod, T., Maruf, U., & Ollomurod, X. (2023). PROSTHETICS A COMPLETE REMOVABLE PROsthESIS BASED ON IMPLANTS. *European International Journal of Multidisciplinary Research and Management Studies*, 3(11), 122-126.
54. Xusanovich, C. F., Sunnat, R., & Sherali, X. (2024). CLASP PROSTHESES–TECHNOLOGY IMPROVEMENT. *European International Journal of Multidisciplinary Research and Management Studies*, 4(03), 152-156.