RISKS AND CONSIDERATIONS IN ORAL REHABILITATION OF ELDERLY HYPERTENSIVE PATIENTS

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Abstract

Oral rehabilitation of elderly hypertensive patients presents specific challenges, given the increased prevalence of systemic complications in this group. Hypertension can significantly influence dental management through drug interactions, oral side effects of antihypertensive therapies, and special needs during dental procedures. The complex and interdisciplinary approach to the management of oral rehabilitation of elderly hypertensive patients is essential to ensure safe and effective treatment. By implementing personalized assessment, intervention and education strategies, the quality of care provided to this group of patients can be significantly improved, optimizing treatment outcomes and improving their quality of life. This article reviews existing literature and explores the main risks and considerations for optimizing oral care in these patients.

Keywords: hypertension, oral health, antihypertensive drugs, management of elderly patients.

1. Introduce

High blood pressure is one of the most common chronic conditions globally and is a major risk factor for developing cardiovascular disease, which are the leading causes of death worldwide. The incidence of hypertension increases with age, affecting a significant proportion of the elderly population. This trend is accompanied by a number of unique challenges in managing the health of these patients, including in the field of dentistry, where the effects of hypertension can complicate both dental evaluations and interventions. [1-3]

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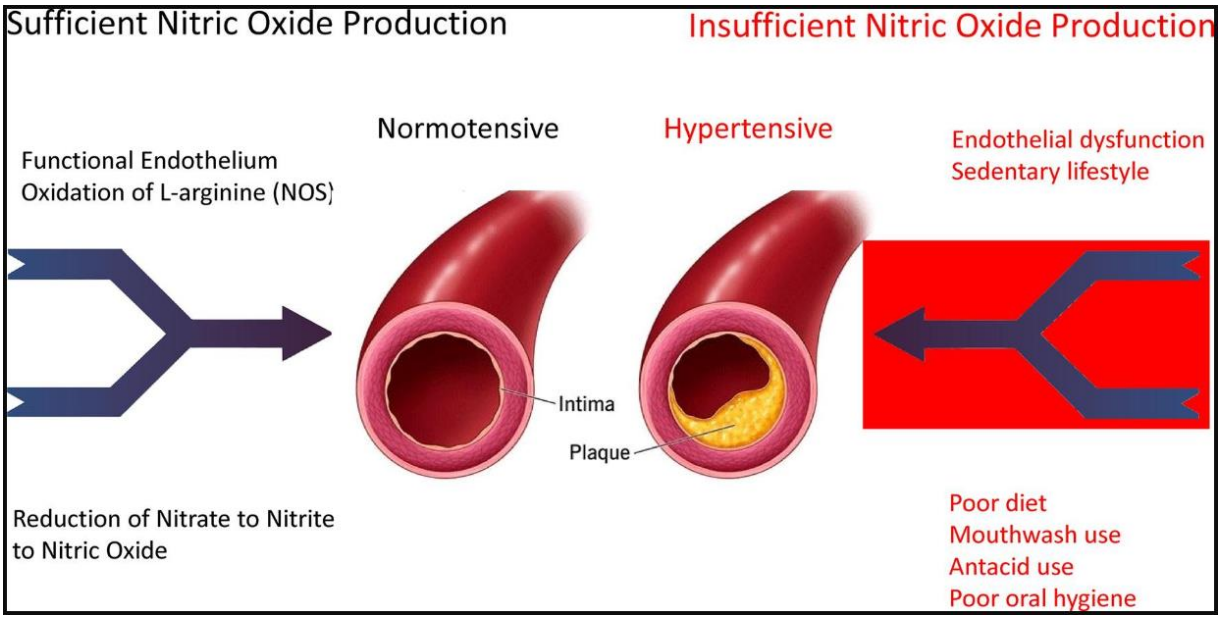

Image 1. A major potential factor in hypertension is nitric oxide efficite. [3]

The elderly often have multiple comorbidities, including hypertension, diabetes and heart disease, which require integrated and personalized medical attention. In the dental context, hypertension not only increases the risk of perioperative complications, but can also influence the response to dental treatments and the ability to heal. For example, fluctuations in blood pressure can affect the administration of local anesthetics, and medications prescribed to control hypertension can interact with dental treatments, causing side effects such as xerostomia or drug gingivitis. [3-5]

Moreover, the oral health of hypertensive patients is often compromised due to age, medication, and poor access to preventive dental care. These aspects emphasize the need for detailed evaluation and careful planning before performing any dental procedure, in order to minimize risks and improve the prognosis of treatment. [2-5]

As the global population ages, it is essential for healthcare professionals to understand and integrate the complex management of elderly patients with hypertension into dental practice. This involves not only adapting dental techniques and materials, but also effective communication with patients and interdisciplinary collaboration with other medical specialties to ensure a holistic and patient-centered approach. These practices not only improve patients' quality of life, but also help reduce the incidence of severe complications by promoting a sustainable and effective model of care. [1-5]

Oral rehabilitation of hypertensive elderly patients with orthodontic appliances requires special attention because of the risks associated with hypertension and old age [6-9]. First, high blood pressure can complicate orthodontic procedures by increasing the risk of bleeding and adverse reactions to anesthesia. Antihypertensive medication can influence oral health, causing xerostomia (dry mouth), which can increase the risk of cavities and gum infections [9-11]. Also, blood pressure should be constantly monitored before and

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after procedures to avoid hypertensive crises. The fragility of teeth and alveolar bone in elderly patients can affect the stability and efficiency of orthodontic treatment. Close collaboration between the orthodontist and the patient's treating physician is essential to adjust medications and monitor overall health. Adapting orthodontic treatment to individual needs and careful risk assessment are crucial for the success of oral rehabilitation in this category of patients. [7-11]

Arterial hypertension can complicate implant-prosthetic procedures and dental coronary reconstruction procedures through increased risk of bleeding and adverse reactions to local anesthetics. Antihypertensive medication can cause xerostomia, favoring the appearance of oral candidiasis, a fungal infection that can compromise oral health and the success of dental treatment. During coronary reconstruction, blood pressure monitoring is essential to prevent intraoperative and postoperative complications. [12-16]

2. Assessment of oral health status

In the context of oral care for elderly hypertensive patients, oral health assessment is crucial and needs to be carefully adjusted to reflect the complexity of associated medical conditions and their impact on oral health. This comprehensive evaluation begins with a detailed history and a thorough clinical examination, and is essential for identifying existing problems and planning appropriate treatment. [17-19, 30-42]

Medical and dental history:

Detailed medical history is the first step in the oral evaluation of elderly hypertensive patients. It is vital to understand the history of hypertensive disease, including the duration of the disease, medication regimen, and blood pressure control. Information should also be obtained about other medical conditions, such as diabetes or heart disease, that may influence dental treatments and response to them. The dental history should include details about the last visit to the dentist, the frequency of preventive dental care, as well as any specific symptoms such as pain, bleeding gums or difficulty mastication, biomaterials involved. [17-19, 43-57]

Clinical examination:

The clinical examination must be meticulous and include assessment of the dental, periodontal and oral mucosal condition. It is important to note any signs of periodontal disease, which is prevalent in hypertensive patients and may be exacerbated by xerostomia — a common consequence of antihypertensive medication. The gums should be evaluated for inflammation, retraction, and the presence of any degree of drug gingivitis. Also, the state of hydration of the oral mucosa and the presence of lesions, ulcers or other abnormalities should be carefully documented, in the context of the systemic evaluation and analysis of the biomaterials and technological lines involved. [17-19, 58-62]

Complementary investigations:

Dental X-rays are essential to assess the condition of the alveolar bone, the presence of subgingival or interdental caries, as well as to detect any other occult pathological conditions. As needed, other types of imaging, such as CBCT scans, may be recommended for a more detailed assessment of dental and bone structures. [17,20]

Functionality evaluation:

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For elderly patients, assessing dental functionality and self-care capacity is crucial. The patient's ability to maintain proper oral hygiene must be determined, which may be influenced by physical factors, such as arthritis, that limit manual dexterity. In these situations, recommendations for adaptations of brushing technique or the use of special oral hygiene devices may be necessary. [17-19]

Cautious planning:

In conclusion, treatment planning for hypertensive elderly patients should be cautious and individualized. Risk management, such as avoiding invasive procedures where blood pressure control is suboptimal, and collaborating with other medical specialties for comprehensive patient management are essential to ensure safe and effective treatment outcomes. This process begins with a careful assessment of oral health and requires an integrated and multidisciplinary approach. [17,18]

3. The impact of antihypertensive drugs on oral health

Medications used in the treatment of hypertension, such as calcium channel blockers and diuretics, are known for their side effects, including gingival hyperplasia and xerostomia, which can affect patients' quality of life and oral hygiene. [18-21]

Antihypertensive medications are essential in managing hypertension, but they can have significant side effects on oral health that can affect quality of life and complicate patients' dental management. Understanding how these drugs influence the oral cavity is crucial for dentists treating hypertensive patients, allowing them to anticipate, recognize, and adequately treat these complications. [18-21]

Xerostomia (dry mouth): One of the most common side effects of antihypertensive drugs, such as diuretics, beta blockers and some calcium channel blockers, is xerostomia. Decreased salivary flow not only causes discomfort, but can also increase the risk of tooth decay, oral infections, and difficulty speaking and swallowing. Saliva also plays a crucial role in buffering acids and remineralizing tooth enamel, so a reduction in saliva production can lead to increased vulnerability to tooth erosion. [18-21]

Image 2. The prexence of xerostomia in the oral cavity and the effects it has on the tongue. [20]

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Gingival hyperplasia: Antihypertensive medications, especially calcium channel blockers such as nifedipine, amlodipine, and verapamil, are known to cause gingival hyperplasia. This condition is manifested by excessive growth of gum tissue, which can complicate oral hygiene and affect the aesthetics of the smile. Management of this condition includes maintaining rigorous oral hygiene and, in severe cases, surgery to reduce excess gingival. [18-21]

Image 3. Gingival Hyperplasia occurs against the background of hypertensive drugs. [21]

Lichenoid reactions: some antihypertensive drugs can induce lichenoid reactions in the oral cavity, manifested by the appearance of whitish, striated or erosive lesions on the oral mucosa. These lesions can often be painful or uncomfortable and can be confused with oral lichen planus, a chronic inflammatory condition. Proper identification and modification of the medication regimen, under the supervision of a physician, is essential for the management of these symptoms. [18-21]

Image 4. Reactia aparruta la pacientii hipertensivi sub forma de Lichen plan. [21]

Altered taste: calcium channel blockers and angiotensin-converting enzyme (ACE) inhibitors can also cause alterations in taste, which can reduce pleasure in eating and affect the patient's nutritional status. These taste changes are usually temporary and may improve after adjusting the dose or changing the medication. [18-21]

Gingival bleeding: Antihypertensive medications, especially ACE inhibitors and angiotensin II receptor blockers, may contribute to an increased tendency to bleed, including in the gums. This is especially important to consider before dental procedures that may involve gum manipulations or tooth extractions. [18-21]

Table 1. It provides an overview of how different classes of antihypertensive medications may affect oral health, helping healthcare professionals anticipate and manage possible complications during dental treatments.

Medicamente Class	Common effects	Implications for oral health

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Diuretics	Dry mouth	Increased risk of caries, chewing difficulties, oral discomfort
Calcium channel blockers	Gingivala hiperplazie	The growth of gum tissue can complicate oral hygiene
Beta Blocker	Bradycardia, hypotension	Interacts with local anesthetics, may require dose adjustment
Inhibitori ACE	Tuse, angioedem	Potential increased risk of gingival bleeding
Angiotensin receptor blockers	Hypotension	Similar to ACE inhibitors, possible increased risk of bleeding
Renin inhibitors	Hypotension, diarrhoea	Monitoring required when administering anesthetics

4. Drug interactions and anesthetic considerations

Local anesthetics containing epinephrine may interact with antihypertensive drugs, increasing the risk of dangerous fluctuations in blood pressure. Careful monitoring of patients and adjustment of anesthetic doses is essential to prevent complications. [20-24]

When treating elderly hypertensive patients within dental practice, it is crucial to understand and manage potential drug interactions, especially in the context of the use of local anesthetics. These interactions can have significant implications for the efficacy and safety of dental treatments, requiring a careful approach and up-to-date information. [20-24]

Drug Interactions:

Antihypertensive drugs can interact with various substances used in dentistry, influencing both blood pressure and response to anesthesia. Beta blockers can potentiate the cardiovascular effects of local anesthetics containing epinephrine, which can lead to bradycardia or lower blood pressure. Diuretics, which are commonly prescribed to manage hypertension, may increase the risk of postural hypotension, especially in combination with anesthetics that can reduce volume. [20-23]

ACE inhibitors and angiotensin receptor blockers may interact with anesthetics, increasing the risk of hypotension. Also, these drugs can increase the patient's susceptibility to bleeding, which is especially important in oral surgical procedures. [19-24]

Anesthetic considerations:

Local anesthetics are a common component of dental treatments, and their selection and use require special attention in hypertensive patients. Epinephrine added to local anesthetics to prolong the anesthetic effect and reduce bleeding may also increase blood pressure. In hypertensive patients, the use of anesthetics with low concentrations of epinephrine is preferable to minimize cardiovascular risks. [20-24]

The administration technique should be impeccable, avoiding intravascular injection, which could lead to a rapid release of epinephrine into circulation, with potentially severe adverse effects. Monitoring the patient during and after administration of the anesthetic is essential,

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as hypertensive or hypotensive reactions can occur quickly. It is advisable to check blood pressure before, during and after treatment, adjusting the therapeutic approach according to the patient's response. Prior consultation with the physician managing the patient's hypertension may be necessary to temporarily adjust the antihypertensive medication prior to major dental procedures or to obtain specific recommendations related to anesthetic management. [20-24]

5. Management strategies in oral rehabilitation

Proper management of elderly hypertensive patients involves interdisciplinary collaboration between cardiologists, family physicians and dentists. It is vital to adapt dental techniques to minimize stress and discomfort in patients, thereby improving treatment adherence and clinical outcomes. Effective management of elderly hypertensive patients within dental practice requires a careful and personalized approach incorporating detailed assessments and intervention strategies tailored to the specific needs of this patient group. The following strategies can help optimize dental treatment and minimize associated risks. [17-12,24]

Rigorous pre-treatment evaluation: before any dental procedure, it is essential to perform a thorough medical evaluation. This includes checking the medication list, consulting medical records to understand the hypertensive history and current stage of the disease, and detailed discussions with the patient about recent symptoms or problems. This information helps anticipate potential complications and plan treatment appropriately. [17-21]

Medication management: it is crucial to understand the side effects of antihypertensive medications on oral health, such as xerostomia or gingival hyperplasia. Working with your doctor to adjust doses or change medication may be necessary to optimize oral conditions and reduce procedural risks. Interactions between local anesthetics and antihypertensive drugs should also be considered. [18-21]

Adapted intervention techniques: in the case of hypertensive patients, invasive procedures should be planned with caution, opting for minimally invasive techniques when possible. It is essential to minimize stress and discomfort to the patient using appropriate anesthetics and relaxation techniques. Control of bleeding is also critical, especially in patients taking clotting medications. [17-12,24]

In the case of hypertensive patients it is preferable to have a prop of using transdermal systems, these are a novelty in the specialized literature and are suitable in these situations due to the fact that they retard release anti-inflammatory substances, antibiotics or natural substances (essential oils without the ability to create adverse reactions), with retard release. [25-28]

Continuous monitoring: vital monitoring, including blood pressure before, during, and after dental procedures, is standard practice for patients with hypertension. This allows early identification of any deviations from the norm and rapid intervention to prevent complications. [17-12,24]

Education and prevention: educating the patient about the importance of oral hygiene is crucial, especially for those with xerostomia or other conditions

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that may increase the risk of cavities or periodontal disease. Learning proper brushing techniques and using oral hygiene aids can help maintain dental health and reduce the need for major interventions. It is important to discuss treatment plans related to orthodontic therapeutic protocols regarding treatment possibilities or maintenance of treatments for local hygiene and preventive purposes. [29-32]

Conclusions

Oral rehabilitation of hypertensive elderly patients requires a careful and personalized approach to reduce the risks associated with dental interventions and promote optimal oral and overall health. By understanding the complexities related to hypertension and oral health, healthcare professionals can provide more effective and safe care.

High blood pressure is one of the most common conditions among the elderly population, with direct implications on dental management. Dental disease among these patients can exacerbate systemic conditions, increasing the risk of cardiovascular morbidity and mortality.

Hypertensive elderly patients are prone to periodontal disease, xerostomia, and other oral conditions that can complicate dental treatment plans. Early identification of these problems is crucial to minimize the impact on their overall health.

In order to effectively manage the impact of antihypertensive drugs on oral health, close collaboration between patient, dentist and treating physician is essential. Adjustments in medication regimen, along with exemplary oral hygiene and regular dental checkups, can help minimize oral side effects and improve the quality of life of hypertensive patients.

Dental treatment of hypertensive elderly patients requires a detailed appreciation of drug interactions and anesthetic considerations to ensure the safety and efficacy of interventions. By working closely with the patient and prescribers, the dentist can optimize dental treatments and reduce risks associated with drug interactions and anesthesia. This level of caution contributes significantly to the quality of care provided to elderly hypertensive patients.

The complex and interdisciplinary approach to the management of oral rehabilitation of elderly hypertensive patients is essential to ensure safe and effective treatment. By implementing personalized assessment, intervention and education strategies, the quality of care provided to this group of patients can be significantly improved, optimizing treatment outcomes and improving their quality of life.

References

1. Southerland JH, Gill DG, Gangula PR, Halpern LR, Cardona CY, Mouton CP. Dental management in patients with hypertension: challenges and solutions. Clin Cosmet Investig Dent. 2016 Oct 17;8:111-120. doi: 10.2147/CCIDE.S99446. PMID: 27799823; PMCID: PMC5074706.
2. Hogan J, Radhakrishnan J. The assessment and importance of hypertension in the dental setting. Dent Clin North Am. 2012 Oct;56(4):731-45. doi: 10.1016/j.cden.2012.07.003. Epub 2012 Aug 29. PMID: 23017548.

DOI : 10.62610/RJOR.2024.2.16.61

3. Nathan S. Bryan,Nitric oxide deficiency is a primary driver of hypertension,Biochemical Pharmacology, Volume 206, 2022,115325,ISSN 0006-2952, https://doi.org/10.1016/j.bcp.2022.115325.
4. Pak KJ, Hu T, Fee C, Wang R, Smith M, Bazzano LA. Acute hypertension: a systematic review and appraisal of guidelines. Ochsner J. 2014 Winter;14(4):655-63. PMID: 25598731; PMCID: PMC4295743.
5. Bavitz JB. Dental management of patients with hypertension. Dent Clin North Am. 2006 Oct;50(4):547-62, vi. doi: 10.1016/j.cden.2006.06.003. PMID: 17000273.
6. Bucur SM, Bud A, Gligor A, Vlasa A, Cocoș DI, Bud ES. Observational Study Regarding Two Bonding Systems and the Challenges of Their Use in Orthodontics: An In Vitro Evaluation. Applied Sciences. 2021; 11(15):7091. https://doi.org/10.3390/app11157091
7. Bucur SM, Cocoș D, Saghin A. Bond strength of three adhesive systems used for bonding orthodontic brackets, Romanian Journal of Oral Rehabilitation Vol.12, pag 162-167, No. 1, January - March 2020.
8. Bejan A, Baciu D, Cocoș DI, Dimofte AR. CONCEPTS ON THE RESISTANCE OF ACRYLIC TEETH, PMMA. MEDICINE AND MATERIALS Volume 3, Issue 1, 2023: 43-47 | ISSN: 2784 – 1499 & e-ISSN: 2784 – 1537 DOI: 10.36868/MEDMATER.2023.03.01.043
9. Cocoș DI, Bucur SM, Coman TM, Păcurar M. Observational study on the frequency of anchorage auxiliaries in fixed orthodontics, Romanian Journal of Oral Rehabilitation vol. 13, nr. 3,(iulie-septembrie) anul 2021.
10. Bucur SM, Iantovics LB, Bud A, Bud ES, Cocoș DI, Vlasa A. Retrospective study regarding orthodontic retention complications in clinical practice Appl Sci 2021. 12 (1) 273.
11. Vlasa A, Bud ES, Păcurar M, Lazăr L, Streiche L, Bucur SM, Cocoș DI, Bud A. Effects of Composite Resin on the Enamel after Debonding: An In Vitro Study—Metal Brackets vs. Ceramic Brackets. Applied Sciences. 2021; 11(16):7353. https://doi.org/10.3390/app11167353
12. Decusara M, Cocoș DI, Caraiane A. REHABILITATION OF AGENESIA 2.2 WITH PRAM INVOLVEMENT. CASE REPORT. MEDICINE AND MATERIALS Volume 3, Issue 1, 2023: 23-30| ISSN: 2784 – 1499 & e-ISSN: 2784 – 1537 DOI: 10.36868/MEDMATER.2023.03.01.023
13. Coman TM, Mănărăzan AD, Cîrstea AS, Cocoș DI. The multidisciplinary approach of a patient with Sjögren´s Syndrome in the dental office – case report, Acta Stomatologica Marisiensis 2019 ;2(2)235-240 https://asmj.ro/tag/hypertension/
14. Pacurar M, Cocoș DI, Lazăr M, Lazăr C, Caraiane A. CONE BEAM COMPUTED TOMOGRAPHY, IMPORTANCE OF EXAMINATION FOR THE STORAGE OF THERAPEUTICAL FAILURES IN IMPLANTOLOGY. MEDICINE AND MATERIALS. Volume 3, Issue 1, 2023: 3-12 | ISSN: 2784 – 1499 & e-ISSN: 2784 – 1537. DOI: 10.36868/MEDMATER.2023.03.01.003
15. Cocoș DI, Earar K, Bucur SM, Păcurar M, Mariș M, Cocoș ID, Galea C. FREQUENCY OF THIRD MOLAR PATHOLOGY: INNOVATIVE CAUSES, SYMPTOMS AND TREATMENT OPTIONS. Romanian Journal of Oral Rehabilitation Vol. 15, No.4 October-December 2023
16. Bucur SM, Popa R, Cocoș DI, Tunyogi AB, Istrate P. Presence of candida albicans in hawley plate wearers: a pilot study Romanian Journal of Oral Rehabilitation Vol. 14, No. 1, January - March 2022. ISSN2066-7000 ISSN-L 2601-4661
17. Little, James W., Craig Miller, and Nelson L. Rhodus. Dental Management of the Medically Compromised Patient-E-Book: Dental Management of the Medically Compromised Patient-E-Book. Elsevier Health Sciences, 2017.
18. Popescu, S. M., Scrieciu, M., Mercuț, V., Țuculina, M., & Dascălu, I. (2013). Hypertensive patients and their management in dentistry. International Scholarly Research Notices, 2013.

DOI : 10.62610/RJOR.2024.2.16.61

19. Becker DE. Preoperative medical evaluation: part 1: general principles and cardiovascular considerations. Anesth Prog. 2009 Autumn;56(3):92-102; quiz 103-4. doi: 10.2344/0003-3006-56.3.92. PMID: 19769423; PMCID: PMC2749585.
20. Bots, C., Beest, A. & Brand, H. The assessment of oral dryness by photographic appearance of the tongue. Br Dent J 217, E3 (2014). https://doi.org/10.1038/sj.bdj.2014.597
21. Kumar, Prashant; Mastan, KMK1; Chowdhary, Ramesh2; Shanmugam, K1. Oral manifestations in hypertensive patients: A clinical study. Journal of Oral and Maxillofacial Pathology 16(2):p 215-221, May–Aug 2012. | DOI: 10.4103/0973-029X.99069
22. Yancey R. Anesthetic Management of the Hypertensive Patient: Part I. Anesth Prog. 2018 Summer;65(2):131-138. doi: 10.2344/anpr-65-02-12. PMID: 29952638; PMCID: PMC6022786.
23. Yancey R. Anesthetic Management of the Hypertensive Patient: Part II. Anesth Prog. 2018 Fall;65(3):206-213. doi: 10.2344/anpr-65-03-17. PMID: 30235430; PMCID: PMC6148691.
24. Nabbi R, Woehlck HJ, Riess ML. Refractory hypotension during general anesthesia despite preoperative discontinuation of an angiotensin receptor blocker. F1000Res. 2013 Jan 14;2:12. doi: 10.12688/f1000research.2-12.v1. PMID: 24358842; PMCID: PMC3752674.
25. Cocoș DI, Dumitriu Buzia O, Tatu AL, Dinu M, Nwabudike LC, Stefan CS, Earar K, Galea C. Challenges in Optimizing Nanoplatforms Used for Local and Systemic Delivery in the Oral Cavity. Pharmaceutics. 2024; 16(5):626. https://doi.org/10.3390/pharmaceutics16050626
26. Dinu M, Tatu AL, Cocoș DI, Nwabudike LC, Chirilov AM, Stefan CS, Earar K, Dumitriu Buzia O. Natural Sources of Therapeutic Agents Used in Skin Conditions. Life. 2024; 14(4):492. https://doi.org/10.3390/life14040492
27. Dumitriu Buzia O, Păduraru AM, Stefan CS, Dinu M, Cocoș DI, Nwabudike LC, Tatu AL. Strategies for Improving Transdermal Administration: New Approaches to Controlled Drug Release. Pharmaceutics. 2023; 15(4):1183. https://doi.org/10.3390/pharmaceutics15041183
28. Feier R, Sireteanu Cucui RM, Ratiu RF, Baciu D, Galea C, Sachelarie L, Nistor C, Cocos D, Hurjui LL, Cernei ER. Comparative Study of Ozonated Olive Oil and Extra Virgin Olive Oil Effects on Oral Hygiene. Applied Sciences. 2023; 13(5):2831. https://doi.org/10.3390/app13052831
29. Solomon O, Galea C, Feier R, MostoveI A. ACTIONS OF DROSERA SP IN DENTISTRY DISEASES. PHITOCHEMICAL COMPONENTS, PHARMACOLOGICAL ACTIONS. MEDICINE AND MATERIALS Volume 3, Issue 1, 2023: 37-42| ISSN: 2784 – 1499 & e-ISSN: 2784 – 1537 DOI: 10.36868/MEDMATER.2023.03.01.037
30. Brănișteanu DE, Dimitriu A, Vieriu M, Boda D, Stoleriu G, Molodoi DA, Brănișteanu D. Cutaneous manifestations associated with thyroid disease. Rev Med Chir Soc Med Nat Iasi, 2014 Sep-Dec; 118(4): 953-958.
31. Toader E, Bahrin LG, Jones PG, Hopf H, Sarbu LG, Stoleriu G. Synthesis of New Morpholine Containing Flavonoids with Potential Biological Applications. REV.CHIM.(Bucharest) 2016;67:8:1520-1522.
32. Decusară M, Cornea D., Tiutiuca C., Dimofte A.R., Topor G., Batir Marin D., Iordăchiță G.V.,. Local Therapy Management of Oral Pathology in Patients with Fixed Orthodontic Appliances During the Covid – 19 Pandemic. Romanian Journal of Oral Rehabilitation. 2022; 14(2) : 200-206;
33. Puisoru, M., Forna, N., Fatu, A.M. Fatu, R., Fatu, C. , Analysis of mandibular variability in humans of different geographic areas, Annals of anatomy-Anatomischer Anzeiger,Volume 188,Issue 6, 2006, Page. 547-554
34. Giuroiu C.L., Vataman M., Melian G., Bularda D., Lozneanu L., Sălceanu M., Pătraşcu A., Andrian S., Melian A. Detection and Assessment of Interleukin 6 in Irreversible Pulp Inflamation. Rev. Chim. 2017, 68(2): 323-327.

DOI : 10.62610/RJOR.2024.2.16.61

35. Giuroiu C.L., Andrian S., Stoleriu S., Scurtu M., Țănculescu O., Poroch V., Sălceanu M. The Combination of Diode Laser and Ozonated Water in the Treatment of Complicated Pulp Gangrene. Appl. Sci. 2020, 10, 4203.
36. Budacu C, Cioranu IC, Chiscop I, Sălceanu M, Melian A. Apicoectomy - Endodontical Surgical Procedure. Rev.Chim, 2017, 68(11): 2654-2657.
37. Sălceanu M, Vataman M, Aminov L, Giuroiu C, Topoliceanu C, Decolli Y, Ghiorghe C-A, Melian A. Diagnosis and follow-up of the periapical lesions in the non-surgical endodontic treatment: a CBCT study. Rom J Oral Reh. 2017; 9(2): 32-36.
38. Martu M.A., Solomon S.M. , Toma V. , Maftei G.A. , Iovan, A. Gamen A. , Hurjui, L. , Rezus, E. , Foia L. Forna N.C. , The importance of cytokines in periodontal disease and rheumatoid arthritis. review,Romanian Journal Of Oral Rehabilitation,2019, 11 (2) , pp.230-240
39. Forna N.C., Dascalu C. , Forna D ., Antohe M.E. , Incidence and prevalence of dental - periodontal conditions and edentation in Moldavia, Medical-Surgical Journal-Revista Medico-Chirurgicala , 2013,117 (1) , pp.205-211
40. Bolat, M; Antohe, M and Forna, NC, Clinical aspects of therapeutical solutions involved in oral rehabilitation of partially edentulous patients, 2013, Romanian journal of oral rehabilitation 5 (4) , pp.75-81
41. Ancuta C ., Pomirleanu C ., Iordache C ., Antohe M.E. , Chirieac R., Ancuta E., Luchian D. , Esanu, I.M., Serum Lipid Profile in Diffuse versus Limited Systemic Sclerosis Data from the SASS cohort, Feb 2018REVISTA DE CHIMIE, 69 (2) , pp.403-406
42. Antohe, M.E. , Stamatin, O., Paval, D., Tibeica, A., Cretu, C ., Forna, N.C., Clinical-technological interactions of treatment in partially extended edentulousness,2022, Romanian journal of oral rehabilitation 14 (1) , pp.195-204
43. Antohe, M.E.,Forna, D.A. ,Dascalu, C.G. ,Forna, N.C., The importance of observing the aesthetic requirements in partial edentulous rehabilitation - implications in medical-dental training, International Journal Of Education And Information Technologies , 2016,10 , pp.199-203
44. Forna, N.C. and Sader, R., Oral rehabilitaion on small substance loss cases,2009,Romanian journal of oral rehabilitation, 1 (4) , pp.15-20
45. Antohe, M.E.; Madarati, M. and Forna, N.C., Clinical-technological requirements in the rehabilitation of partially extended edentulousness complications, Romanian journal of oral rehabilitation, 2021, 13 (4) , pp.194-200
46. Murariu, A., Hanganu, C., Bobu, L., Vasluianu, R ., Geletu, G ., Baciu, R. , Stafie, C.S. , Forna, N.C. ,
Comparative study of oral health systems in Europe, Romanian journal of oral rehabilitation, 2020, 12 (4) , pp.11-17
47. . Forna, N.C. and Pepi, P., Non-invasive methods of paraclinical evaluation involved in oral rehabilitation, Romanian journal of oral rehabilitation, 2009, 1 (2) , pp.11-19
48. Gradinaru, I., Ignat, L., Giurgiu, L.C., Dascalu, C.G. , Hurjui, L.L. , Ignat, M.E. , Doroftei, F. , Surlari, Z. , Fotea, S ., Gurau, G., Study on the Surface Condition of Composite Biomaterials Related to Saliva pH, 2020, Materiale Plastice 57 (3) , pp.174-179
49. Nemtoi, A., Nemtoi, A .,Fochi, A., Sirghe, A.E. , Preda, C. , Earar, K ., Beznea, A ., Onisor, C. , Iorgulescu, G ., Haba, D., CBCT Evaluation of the Mandibular Bone Quality in Relation to Skeletal Status After Treatment with Strontium Renelate in Diabetic Patients, Revista de chimie, 2019, 70 (11) , pp.4113-4118
50. Botnariu G., Forna N., Popa A.,Popescu R ., Onofriescu A. ,Cioloca D., Lacatusu C. , Mihai B. ,Correlation of Glycemic Control Parameters in Non-Diabetic Persons with Cardiovascular Risk Scores - Results from a Cross-Sectional Study,Revista De Chimie , 2017, 68 (1) , pp.108-110

DOI : 10.62610/RJOR.2024.2.16.61

51. F Mitu, IL Dumitriu, CE Schiriac, LG Vata, B Gurzu. Effect of supervised lifestyle changes on metabolic syndrome-associated inflammation. Acta Endocrinologica (Buc) 2013 9(2): 249-262.
52. Gradinaru, I., Hurjui, L., Macovei, G., Antohe, M.E., Interrelations between skeletal removable prostheses and the improvement of patient' s quality of life,Romanian Journal Of Oral Rehabilitation, 2019, 11 (4) , pp.85-92
53. Leca, D. ,Calin, A.M., Earar, K. ,Nechita, A. , Chiscop, I., Dorobat, G. , Dorobat, C. , Ilie, M., Debita, M ., Biochemical Changes of Cerebrospinal Liquid in Viral Meningitis, Revista de chimie, 2015, 66 (12) , pp.2005-2008
54. Esanu, I., Debita, M , Dorobat, CM , Iliescu, AA , Matei, MN , Palade, DO Earar, K , Chemical and Biological Factors in Infectious Diseases The oral microbial flora, Revista de chimie ,2019, 70 (4) , pp.1420-142
55. Ancuta, C., Pomîrleanu, C., Mihailov, C., Chirieac, R., Ancuta, E. , Iordache, C. , Bran, C . Tanculescu, O. , Efficacy of baricitinib on periodontal inflammation in patients with rheumatoid arthritis, Joint Bone Spine, 2020, 87 (3) , pp.235-239
56. Gradinaru, I , Jipu, R, Hurjui, LL , Pendefunda, AAC , Armencia, A.O. , Mitrea, M. , Antohe, M.E., Current aspect of metal-ceramic-biomaterial restorations and technology, Romanian journal of oral rehabilitation, 2020, 12 (2) , pp.116-127
57. Luca, E., Iordache, C., Tanculescu, O., Surlari, Z ., Virvescu, D. , Checherita, L ., Ciocan-Pendefunda, A ., Beldiman, M., A., Aspects of aesthetic rehabilitation using digital smile design, Romanian journal of oral rehabilitation, 2019, 11 (2) , pp.119-123
58. Mitrea M, Bozomitu LI, Tepordei RT, Gurzu IL, Walid EA, Stefanescu OM, Vicoleanu SAP, Niculescu S, Hreniuc IJ, Tecuceanu A, Dmour A, Maxim RR, Ciurcanu OE, Danila V. The sinus lift procedure applied in cases where the thickness of the bone is insufficient using double PRF as well as in the case of an intrasinus mucocele. Romanian Journal of Oral Rehabilitation 2023, 15(1):66-81.
59. Gurzu IL, Mitu F, Gorgan LD, Vata LG, Gurzu B, Petris OR. The anti-inflammatory effect of pulmonary renin angiotensin system blockade. Acta Endo (Buc) 2015, 11(1): 7-
60. Buhaceanu, R ., Lungu, NC , Forna, NC , Asaftei, IV , Chirita, P , Birsa, ML, The Influence of Bromine Substituent on Optical Properties of Some 1,3-Dithiolium Derivatives 2013, REVISTA DE CHIMIE 64 (9) , pp.960-964
61. Dumitriu IL, Gurzu B, Cojocaru E, Slătineanu SM, Enea M. COURSE NOTES Validation of GOD/PAP method for quantitative determination of glucose concentration in human serum. Revista Română de Medicină de Laborator 2011;19(1/4): 85–100.
62. Agop, M ,Forna, N , Casian-Botez, I , Bejenariu, C , New theoretical approach of the physical processes in nanostructures,Apr 2008, JOURNAL OF COMPUTATIONAL AND THEORETICAL NANOSCIENCE, 5 (4) , pp.483-489

DOI : 10.62610/RJOR.2024.2.16.61