ORIGINAL ARTICLE

MANAGEMENT OF THE HYPERTENSIVE PATIENT IN THE DENTAL OFFICE

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Abstract: This study investigates the dental treatment possibilities for patients with arterial hypertension, focusing on the interplay between systemic health and oral care. Conducted at the Oral Rehabilitation Clinic of the Faculty of Dental Medicine in Craiova, Romania, the research involved 820 patients aged 25–75, including both hypertensive individuals and a control group. Findings revealed a higher prevalence of dental issues among hypertensive patients, characterized by elevated DMFT scores, increased plaque accumulation, and deeper periodontal probing depths. Risk factors such as high salt intake, alcohol consumption, smoking, stress, and genetic predisposition were prevalent in the hypertensive cohort. Additionally, some patients experienced gingival hyperplasia as a side effect of antihypertensive medications, notably calcium channel blockers. The study underscores the necessity for personalized dental treatment plans that consider blood pressure control, medication effects, and overall health status. Furthermore, it highlights the importance of interdisciplinary collaboration between dental and medical professionals to optimize care for hypertensive patients. These insights contribute to the development of comprehensive care strategies that integrate dental and medical expertise.

Keywords: hypertension, oral health, dentistry, dental treatment, interdisciplinary collaboration

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1. Introduction

Hypertension (HTN) remains one of the most prevalent and modifiable risk factors for cardiovascular morbidity and mortality worldwide. According to recent data, hypertension affects approximately 30–40% of the global adult population, posing a major public health burden [1]. The definition of hypertension has been refined in recent years: while older thresholds (e.g., ≥140/90 mmHg) were standard, many guidelines now recognize lower thresholds (e.g., ≥130/80 mmHg) for diagnosis and treatment initiation in high-risk populations [2].

Despite the availability of effective antihypertensive therapies, blood pressure control remains suboptimal. In the United States, recent analyses showed that the proportion of adults with controlled hypertension has stagnated or declined in the past decade [3]. Globally, uncontrolled hypertension (uHTN) and treatment-resistant hypertension (rHTN) remain significant challenges, especially in patients with comorbidities or complex cardiovascular profiles [4]. For instance, a single-center study found that approximately 3.4% of hypertensive patients met criteria for resistant hypertension, most of whom had high or very high cardiovascular risk [5].

In the context of dental practice, hypertensive patients pose specific challenges. First, many patients presenting for dental care may have undiagnosed or poorly controlled blood pressure, since hypertension is often asymptomatic [6]. Second, dentists must consider how both hypertension and its pharmacologic treatment may interact with dental procedures, including the use of local anesthetics with vasoconstrictors, management of bleeding risk, and potential drug interactions [6]. Finally, the dental office represents an opportunity for opportunistic screening and early referral for medical evaluation, particularly in patients without regular access to primary care [7].

The 2024 ESC Clinical Practice Guidelines, introduced a significantly simplified classification system for office blood pressure (BP) measurement, aimed at enhancing clinical applicability and decision-making [8]. The classification now includes only three main categories: non-elevated BP, elevated BP, and hypertension, eliminating the older multi-tiered system that included “optimal,” “normal,” and “high-normal” ranges [9].

Patients with non-elevated blood pressure (i.e., <120/70 mmHg) are not candidates for pharmacological treatment and should undergo routine monitoring only. Those with elevated BP (systolic 120–139 mmHg and/or diastolic 70–89 mmHg) require a more nuanced evaluation. According to Williams et al. [10], treatment decisions in this category depend on the individual's total cardiovascular risk, presence of organ damage, or comorbid conditions such as diabetes or chronic kidney disease. For individuals with hypertension, defined as a systolic BP ≥140 mmHg and/or diastolic BP ≥90 mmHg, diagnosis must be confirmed through repeated office or out-of-office measurements. Once confirmed, initiation of antihypertensive therapy is generally indicated. Whelton and Carey emphasize that out-of-office blood pressure measurements (via home or ambulatory monitoring) are increasingly critical to accurate diagnosis and management, as they

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correlate better with target-organ damage and long-term outcomes [11].

The 2024 guidelines also propose lower treatment targets than previous versions. Specifically, McEvoy et al. recommend that most patients under treatment should aim for a systolic BP between 120–129 mmHg, provided this target is well tolerated [8]. Kreutz et al. highlight this as a major shift from the 2018 and 2023 guidelines, reinforcing the need for more aggressive, individualized BP management strategies [9].

Hypertension (HTN) significantly impacts dental care, necessitating tailored management strategies to ensure patient safety and optimal outcomes. Elevated blood pressure levels can increase the risk of cardiovascular complications during dental procedures, especially those involving anxiety, pain, or use of vasoconstrictors [12]. Patients with uncontrolled hypertension are at higher risk for intraoperative hypertensive crises, which can lead to adverse events such as stroke or myocardial infarction [13].

The use of local anesthetics containing vasoconstrictors, such as epinephrine, is common in dental procedures to prolong anesthetic effect and reduce bleeding. However, vasoconstrictors may transiently raise blood pressure and heart rate, posing a potential risk for hypertensive patients. Studies have shown that careful dose control and avoidance of excessive vasoconstrictor amounts can mitigate these risks, and local anesthesia remains generally safe when used appropriately [14]. Furthermore, drug interactions between antihypertensive medications (e.g., beta-blockers, calcium channel blockers) and dental drugs must be considered to avoid adverse effects such as excessive hypotension or arrhythmias [15].

Dental procedures themselves can trigger sympathetic nervous system activation due to anxiety or pain, which can exacerbate hypertension. Effective pain management and anxiety control, including behavioral techniques and pharmacological support, are therefore crucial in hypertensive patients undergoing dental treatment [16]. Moreover, certain antihypertensive agents may cause oral side effects, including xerostomia, gingival overgrowth (notably with calcium channel blockers like nifedipine), and altered taste, which require specific dental management [17].

Importantly, the dental office represents a valuable setting for opportunistic blood pressure screening and early detection of hypertension. Studies suggest that many dental patients are unaware of their hypertensive status, and routine BP measurement during dental visits can facilitate timely medical referral and improve cardiovascular outcomes [18].

The aim of the study was to determine the possibilities for dental treatment in patients with arterial hypertension (HT), and to highlight the factors that influence the dental treatment plan in patients with HT and the way of implementing it in everyday dental practice with the goal of achieving the best outcomes, offering a standard of life quality and maintaining the oral health of these patients.

2. Materials and method

The study was conducted on a group of dental patients who attended the Oral Rehabilitation clinical rotations at the Faculty of Dental Medicine, Craiova on a period of

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eight years, from 2013 to 2020, including patients from general population but also from Craiova Nursing Home.

The patients consented to clinical examination and completed a health questionnaire. All patients included in the study gave informed consent for all medical procedures performed. All participants signed the data management agreement (GDPR) and completed the standard form for inclusion in medical research according to Law no. 46/2003. The study was approved by the Ethics Committee of the University of Medicine and Pharmacy of Craiova, with no 22/31.01.2013.

For each patient, a detailed medical history was taken, during which data regarding general health and medication were recorded, along with extraoral and intraoral clinical examinations. For each patient a file was completed; inspection, palpation, and evaluation of the dental-periodontal status were conducted; photographs were taken; a diagnosis was established, a treatment plan was laid out, and the progression of the case was monitored.

3. Results

820 patients were included in this study, aged between 25 and 75 years. Of these, 438 patients were female and 382 patients were male. Among the patients included in the study group (with HTN), 377 were aged between 30–50 years, 315 between 50–65 years, and 128 were over 65 years. Most patients in the control group fell in the 30–50 age range, followed by the 50–65 age group, and then those over 65 years (Table no.1).

Table 1. Demographic data.

Parameter	Category	Control Group (without HTN)	Study Group (with HTN)	Total
Gender	Women	405	33	438
	Men	352	30	382
Age (years)	30-50	355	22	377
	50-65	288	27	315
	Over 65	114	14	128
Total	-	755	63	820

Among the risk factors that lead to arterial hypertension, the most frequently encountered in the study group were salt intake, alcohol consumption, smoking, stress from various situations, and genetic factor (Table no.2).

Table 2. Risk factors for arterial hypertension in the study group.

Risk Factor	Women	Men	Total
High salt intake	11	20	31
High alcohol consumption	7	15	22
Smoking	4	9	15
Sedentary lifestyle	22	14	36
Stress	33	20	53
Age	3	4	7
Family history	6	13	19
Sleep apnea	0	0	0
Kidney diseases	2	3	5

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Thyroid diseases	12	3	15
Adrenal gland disorders	0	0	0
Depression	5	1	6

In the control group, women and men exhibited average blood pressures of 122/78 mmHg and 124/76 mmHg respectively, while in the hypertensive study group their values rose to 153/95 mmHg and 169/103 mmHg. Overall, the aggregate average blood pressure increased from 123/77 mmHg in non-hypertensive individuals to 161/99 mmHg in hypertensive subjects, with a combined mean of 142/88 mmHg (Table no.3).

Table 3. Average blood pressure values of patients in the study group.

Sex	Control Group (without HTN)	Study Group (with HTN)	Average BP Value
Women	122/78 mmHg	153/95 mmHg	138/87 mmHg
Men	124/76 mmHg	169/103 mmHg	147/90 mmHg
Average BP Value	123/77 mmHg	161/99 mmHg	142/88 mmHg

Following the intraoral clinical examination, it was found that the oral health of patients in the study group is poor. The patients have a large number of missing and decayed teeth and a small number of treated teeth, the mean DMFT being quite high (Figure 1).

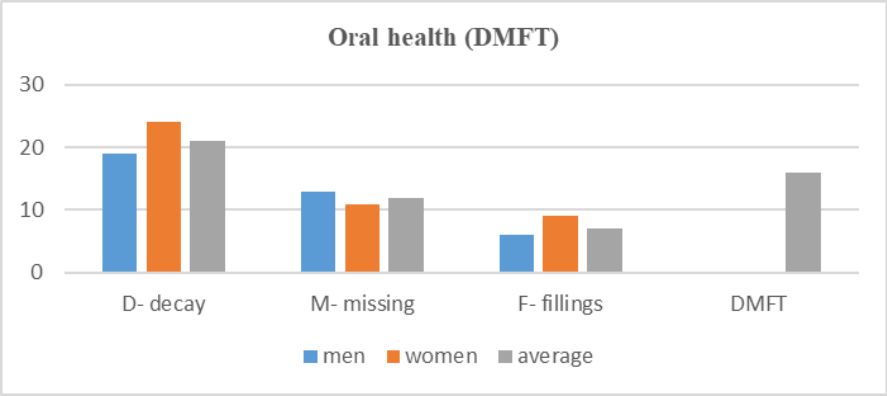

Figure 1. DMFT index of the patients from the study group.

In the examined cohort, edentulous patterns followed the Kennedy classification, with seventeen patients showing Class I edentulism (ten women, seven men), eight female patient and six men displaying Class II. Six men and four women patient were diagnosed with Class III edentulism; notably, no cases of Class IV edentulism occurred. This distribution suggests that free-end (posterior) edentulous spaces (Classes I and II) are more prevalent in this hypertensive sample than anterior bounded spaces, which may influence prosthetic planning, support requirements, and biomechanical considerations in partial denture design. (Table no.4).

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Table 4. Types of edentulism in the patients from the study group.

Kennedy Class	Women	Men	Total
Kennedy Class I edentulism	10	7	17
Kennedy Class II edentulism	8	6	14
Kennedy Class III edentulism	4	6	10
Kennedy Class IV edentulism	0	0	0

The hypertensive patients from this study exhibited a range of dental issues, from dentin hypersensitivity and carious lesions to partial or total edentulism and periodontal complications. Most patients were on antihypertensive medication, with notable differences in blood pressure control and treatment adherence. Poor oral hygiene was a common factor, linked to the progression of dental and periodontal lesions, highlighting the interconnection between hypertension and oral health. Additionally, the impact of antihypertensive drugs, such as calcium channel blockers, was observed in the development of gingival hyperplasia in some patients. Despite variations in age, living environment, and medical history, dental treatments were individually tailored considering blood pressure control and overall patient condition (Figure 2).

(a) (b) (c)

Figure 2. Clinical photos of the some of the patients from the study group, showing: (a) cervical carious lesions; (b) following the removal of the prosthetic restoration, the coronal abutments exhibited structural fractures and active carious lesions, indicating underlying dental tissue compromise; (c) patient with Kennedy class III/1 mandibular edentulism, poor oral hygiene and a non-restorable root remnant.

4. Discussion

The management of hypertension primarily focuses on reducing cardiovascular risk through effective blood pressure control, which involves lifestyle modifications combined with pharmacological therapy when necessary. The main classes of antihypertensive medications recommended by recent guidelines include angiotensin-converting enzyme inhibitors (ACE inhibitors), angiotensin II receptor blockers (ARBs), calcium channel blockers (CCBs), thiazide and thiazide-like diuretics, and beta-blockers [19]. ACE inhibitors and ARBs work by modulating the renin-angiotensin-aldosterone system (RAAS), thereby reducing vasoconstriction and sodium retention. Calcium channel blockers act by inhibiting calcium influx in vascular smooth muscle,

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causing vasodilation, whereas diuretics reduce blood volume by promoting renal sodium and water excretion [20].

Beta-blockers, although less favored as first-line therapy in some recent guidelines, are still used particularly in patients with specific indications such as ischemic heart disease or arrhythmias [21]. Combination therapy is often required to achieve target blood pressure levels, especially in patients with stage 2 hypertension or additional cardiovascular risk factors [22]. Newer therapeutic options and personalized medicine approaches continue to evolve, aiming to improve efficacy and reduce side effects [23].

Dentists play a significant role in oral health and prevention, so, they should have a positive attitude and self-efficacy in doctor-patient communication with practical applications. Communication skills should be included as an important educational goal for dentists and given enough weight in objective, systematic clinical assessments [24, 25]. These cases emphasize the importance of integrated dental management and close collaboration with cardiologists to optimize care for hypertensive patients.

In hypertensive patients, particular attention is drawn to the importance of oral hygiene, as poor oral hygiene has been observed to exacerbate cardiovascular disease. A recent study [26], which included a cohort of over 800 romanian patients, found that the most frequent systemic diseases in the studied group were hypertension, allergies, anemia, sinusitis, sleep disorders, and type II diabetes. The findings highlight the significant impact of hypertension on oral health and underscore the importance of integrated dental and medical management [27].

In hypertensive patients, special attention is drawn to the importance of oral hygiene, as poor oral hygiene has been observed to contribute to the worsening of cardiovascular disease. A recent national study [28] conducted in Italy, demonstrated that home oral hygiene habits, such as brushing teeth at least three times a day and using an electric toothbrush, are inversely associated with blood pressure profiles, independent of sex, age, body mass index, smoking, diet, physical activity, and history of diabetes or hyperlipidemia. This association suggests that adequate oral hygiene may help prevent hypertension and related cardiovascular complications. Additionally, studies [29] from southwestern Romania evaluated periodontal status and oral hygiene in hypertensive patients, emphasizing the importance of maintaining proper oral hygiene in this population.

Several of the risk factors observed in our study have likewise been reported by other researchers as significant contributors to hypertension: high alcohol consumption is significantly associated with increased risk of hypertension, particularly in men. A 2025 meta-analysis emphasizes a near-linear relationship between alcohol intake and blood pressure elevation in men, whereas in women, effects become significant only at higher consumption levels [30].

Regarding salt intake, current research highlights that high dietary sodium is associated with a marked increase in cardiovascular mortality. The adverse effects are amplified by an imbalanced sodium-to-

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potassium ratio, especially among women [31].

Physical inactivity remains an important risk factor in low- and middle-income populations. A recent multi-country study found a strong association between sedentary behavior and hypertension, particularly when coupled with obesity and poor diet [32].

Psychological stress and family history of hypertension are less frequently quantified in clinical trials, but recent evidence shows that their interaction with alcohol use and genetic predisposition may significantly amplify hypertension risk, especially among women [33].

Age is a non-modifiable yet highly relevant predictor of hypertension. Recent findings suggest that, beyond a certain age, women tend to have a higher prevalence of uncontrolled hypertension compared to men [34].

Moreover, sex-specific analysis of risk exposure is essential. For instance, a recent study on alcohol use and hypertension showed that while men have a higher absolute prevalence, the relative hazard ratio (HR) for alcohol exposure is often greater in women when compared to their non-drinking counterparts [35].

Collaboration between dentists and cardiologists is essential for managing hypertensive patients, as oral health can influence cardiovascular outcomes [36]. Studies show that dentists play a crucial role in identifying undiagnosed hypertension and managing associated risks [37]. For instance, a two-step hypertension screening conducted in dental offices identified 170 newly diagnosed hypertensive patients, highlighting the potential of dental settings for early detection [36]. However, research from Saudi Arabia revealed that only 13.3% of dentists regularly measure blood pressure before treatment, indicating a need for better training and clear protocols [38]. Additionally, studies have demonstrated that periodontitis and tooth loss are linked to increased cardiovascular risk, suggesting that dental care significantly impacts cardiovascular health [39] and have highlighted [40] the importance of adequate management of hypertensive patients in dental settings, emphasizing the need for careful assessment of cardiovascular status prior to dental procedures. Therefore, promoting interdisciplinary collaboration between dental and cardiology professionals is crucial for comprehensive patient care.

In recent years, digital technologies have shown their potential to improve efficiency and communication in healthcare settings. A study [41] on the use of digital tools in transferring data between a dental office and a dental laboratory, found out that while orthopantomograms (OPG) were universally used, more advanced modalities like intraoral scanning and digital impressions were still underutilized. Drawing a parallel to hypertension care, similar digital systems could enable real-time sharing of blood pressure data, medical imaging, patient history across care teams, or medication adherence reports, can support timely interventions and personalized treatment plans, especially in multidisciplinary care settings.

A higher prevalence of dental issues among hypertensive patients was observed in our study, as evidenced by elevated DMFT scores compared to the control group. This finding aligns with recent research indicating

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a significant association between hypertension and poor oral health. For instance, a study conducted in Romania reported that hypertensive individuals exhibited higher plaque and bleeding indices, along with increased probing depths, suggesting a greater risk of periodontal disease [26]. This study identified several risk factors contributing to hypertension among dental patients, including high salt intake, alcohol consumption, smoking, stress, and genetic predisposition. These factors are consistent with those reported in the literature. A recent study found that poor oral hygiene and periodontal disease were associated with increased blood pressure, potentially through systemic inflammation pathways [42]

Many hypertensive patients were on antihypertensive medications, with some experiencing side effects such as gingival hyperplasia. This is corroborated by existing literature, which indicates that certain antihypertensive drugs, like calcium channel blockers, can lead to gingival overgrowth, necessitating careful dental monitoring. [42].

Recent evidence suggests a strong link between oral health and cardiovascular conditions. Hospitalized adults with a lower number of remaining teeth were found to have a higher prevalence of specific cardiovascular diseases, indicating that tooth loss may serve as a predictive marker for cardiovascular risk [43,45]. The interplay between cardiovascular medications and dental management has also been highlighted, as the use of propranolol can affect serum concentrations of local anesthetics during dental procedures, emphasizing the need for careful clinical planning in hypertensive patients [44]. Additionally, subjects with cardiovascular diseases exhibited more pronounced dental wear compared to individuals without systemic conditions, suggesting that systemic disease may accelerate oral tissue degeneration [45]. Collectively, these findings underscore the importance of integrating oral health assessments into cardiovascular risk evaluation, reinforcing the bidirectional relationship between dental status and systemic disease [43, 46].

Our study emphasizes the need for interdisciplinary collaboration between dental and medical professionals to manage hypertensive patients effectively, supported by recent research, which suggests that dental professionals play a crucial role in identifying undiagnosed hypertension and managing its oral manifestations [47].

5. Conclusions

- *Prevalence of Oral Health Issues*: Hypertensive patients exhibited a higher prevalence of dental problems, including increased DMFT scores, compared to the control group.
- *Risk Factors for Hypertension*: Key risk factors contributing to hypertension among dental patients included high salt intake, alcohol consumption, smoking, stress, and genetic predisposition.
- *Impact of Antihypertensive Medications*: Some hypertensive patients experienced side effects such as gingival hyperplasia due to antihypertensive medications, necessitating careful dental monitoring.
- *Need for Interdisciplinary Collaboration*: Effective management of hypertensive patients requires interdisciplinary collaboration between dental and medical professionals to address both oral and systemic health.

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- *Importance of Individualized Dental* Treatment Plans: Dental treatment plans for hypertensive patients should be tailored to individual needs, considering factors like blood pressure control, medication use, and overall health status.

These conclusions underscore the complex relationship between hypertension and oral health, highlighting the necessity for comprehensive care strategies that integrate dental and medical expertise.

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Conflict of interest statement

The authors declare no conflicts of interest concerning this study.

Data availability statement

Will be provided on request.

Ethics statement

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