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Interdisciplinary Implant Prosthetic Rehabilitation in a Patient With Hypertension and Dental Anxiety: A Case Report

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Abstract

Hypertension and dental anxiety can complicate extensive surgical and prosthetic dental treatment, particularly when multiple procedures and prolonged appointments are required. This case report describes the interdisciplinary management of a 59-year-old woman who presented with a compromised maxillary implant and mucosa-supported prosthetic rehabilitation. Clinical and radiographic evaluation demonstrated four existing implants, peri-implant bone loss, gingival inflammation, and additional restorative and endodontic findings requiring comprehensive reassessment. At the initial consultation, the patient was visibly anxious and had a blood pressure of 180/110 mmHg. Elective treatment was deferred, and she was referred for medical evaluation and management of her hypertension and anxiety. Dental anxiety was evaluated through the patient's reported history and clinical presentation rather than a validated assessment instrument. Fifteen days later, after taking her prescribed enalapril, her blood pressure was 129/85 mmHg, and digital records were obtained for provisional treatment planning. Digital visualization was also used to explain the proposed rehabilitation and improve the patient's understanding and confidence before treatment. At a subsequent appointment, her blood pressure was 125/89 mmHg, allowing treatment to proceed.

As part of the staged rehabilitation, tooth #8 was extracted, and the site underwent bone grafting. Maxillary sinus augmentation was performed in the region of tooth #3 using autologous platelet-rich fibrin and a collagen membrane, followed by placement of an MIS implant in the #3 region, resulting in a total of five maxillary implants incorporated into the rehabilitation plan. After a six-month healing period, the definitive restorative phase was initiated during a single clinical session lasting approximately four hours. The provisional restoration was removed, scan bodies were used for digital implant impressions, and the restorative procedures for the implant and mucosa-supported zirconia prosthesis extending from the #3 to #10 region, zirconia veneers on teeth #11 and #12, and a three-unit zirconia fixed dental prosthesis extending from #13 to #15 were completed. Three and a half weeks later, the definitive prosthetic restorations were delivered and evaluated for adaptation, occlusion, function, and esthetics. At the three-month follow-up, the rehabilitation demonstrated a favorable clinical outcome, and the patient remained satisfied with the functional and esthetic results. This case highlights the importance of recognizing markedly elevated blood pressure, coordinating medical management, addressing dental anxiety, and using staged interdisciplinary planning when providing complex implant prosthetic rehabilitation.

Categories: Cardiology, Oral Medicine, Dentistry
Keywords: dental anxiety, dental implants, hypertension, implant-supported prosthesis, maxillary sinus augmentation

Introduction

Hypertension is a frequently encountered systemic condition in dental practice and represents an important consideration when planning invasive, lengthy, or surgically demanding procedures. Patients may be unaware that their blood pressure is elevated, while others with a previous diagnosis may present with inadequate control at the time of a dental appointment. Consequently, blood pressure measurement and assessment of the patient's medical history are important components of preoperative evaluation. Markedly elevated blood pressure identified before an elective procedure may alter the treatment plan and indicate the need to postpone treatment, reassess the patient, or obtain medical evaluation before proceeding [1-4]. These considerations become particularly important when treatment involves implant surgery, bone augmentation, or prolonged restorative appointments.

Dental anxiety adds another dimension to the management of patients with hypertension. Fear of dental procedures, previous negative experiences, anticipation of pain, and the clinical environment itself may contribute to physiological stress responses during treatment. For this reason, evaluation of anxiety, effective communication, stress reduction strategies, and repeated assessment of vital signs can be

important components of dental management in susceptible patients. The objective is not simply to complete the planned dental procedure but to determine whether the patient can safely undergo treatment at that particular appointment. When abnormal vital signs are identified, coordination with the patient's physician may be appropriate before elective treatment is resumed [5].

The challenge becomes greater when a medically complex patient also requires extensive implant and prosthetic rehabilitation. Existing implant-supported restorations may develop biological, mechanical, functional, or esthetic complications over time. Peri-implant inflammation and progressive peri-implant bone loss can compromise the stability and long-term prognosis of an existing rehabilitation [6,7]. Management therefore requires careful clinical and radiographic evaluation of the implants, peri-implant tissues, available bone, prosthetic design, occlusion, and esthetic requirements before a new treatment plan is established. In complex cases, a staged approach can allow the clinician to address biological and surgical problems before proceeding with definitive prosthetic reconstruction.

Insufficient bone volume in the posterior maxilla presents an additional challenge when an implant is required to improve posterior support. Maxillary sinus augmentation is a widely used surgical approach for increasing the available bone volume in this region before or in conjunction with implant placement [8,9]. Regenerative strategies may incorporate autologous platelet concentrates, such as platelet-rich fibrin (PRF), and barrier membranes depending on the surgical indication and clinical protocol [10,11]. These procedures require careful treatment sequencing because adequate healing and implant integration must be achieved before the definitive prosthetic phase is completed.

Modern digital workflows can also facilitate the restorative phase of complex implant treatment. Intraoral scanning and implant scan bodies allow the three-dimensional positions of implants to be transferred to the digital restorative workflow and can assist in the fabrication of definitive implant-supported prostheses [12,13]. When implant rehabilitation is combined with treatment of the remaining dentition, coordination between surgical and restorative clinicians becomes particularly important. The final treatment plan must integrate implant position, soft tissue condition, occlusion, tooth preparation, restorative materials, esthetics, and patient expectations rather than considering each procedure independently.

This case report describes the interdisciplinary management of a 59-year-old woman with hypertension and dental anxiety who presented with compromised maxillary implant- and mucosa-supported prosthetic rehabilitation, peri-implant bone loss, gingival inflammation, inadequate posterior support, and esthetic concerns. A blood pressure reading of 180/110 mmHg identified at the initial consultation, consistent with Stage 2 hypertension according to the 2017 American College of Cardiology/American Heart Association (ACC/AHA) classification [14], resulted in postponement of elective dental treatment and referral for medical evaluation and management. After improvement in blood pressure, treatment was performed in stages and included management of the existing prosthetic rehabilitation, maxillary sinus augmentation, placement of an additional implant in the #3 region, a healing period before definitive restoration, digital implant impressions using scan bodies, and comprehensive zirconia rehabilitation. The purpose of this report is to illustrate the importance of recognizing medical risk before elective dental treatment and integrating blood pressure monitoring, anxiety management, medical coordination, surgical treatment, digital implant dentistry, and interdisciplinary prosthetic planning to achieve a satisfactory short-term functional and esthetic outcome.

Case Presentation

A 59-year-old woman presented for evaluation of an existing maxillary implant and mucosa-supported prosthetic rehabilitation that was in poor clinical condition. The patient expressed concerns regarding the condition, function, and appearance of the existing prosthesis and was interested in comprehensive replacement of the rehabilitation. Her medical history was significant for hypertension and dental anxiety.

Clinical examination demonstrated an extensively compromised maxillary prosthetic rehabilitation extending through the anterior and posterior maxillary regions. Gingival inflammation was evident in the peri-implant region. Radiographic examination was performed to evaluate the existing implants, surrounding bone, endodontically treated teeth, and potential sites for additional implant treatment. The initial panoramic and periapical radiographs demonstrated the existing implant-supported rehabilitation, peri-implant bone loss, and additional radiographic findings requiring comprehensive reassessment. The clinical and radiographic findings, together with the condition of the existing prosthesis, indicated the need for staged surgical and prosthetic rehabilitation (Figure *1*).

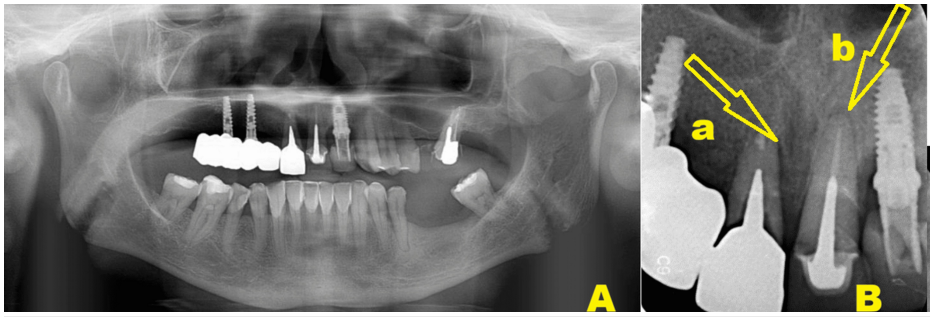


FIGURE 1: Initial Radiographic Findings Before Comprehensive Implant Prosthetic Rehabilitation.

(A) Initial panoramic radiograph demonstrating the patient's pre-existing maxillary rehabilitation. Two implants support a six-unit fixed dental prosthesis with cantilevered terminal units. Additional findings include previously endodontically treated teeth and radiographic bone loss associated with the implant in the #9 region. Teeth #11 and #12 presented with existing veneers that were clinically considered inadequately adapted, and the region from #12 to #15 was subsequently planned for a new fixed dental prosthesis.

(B) Periapical radiograph providing a detailed view of the maxillary anterior region. Arrow a indicates widening of the periodontal ligament space, while arrow b indicates a periapical radiolucent change associated with a previously endodontically treated tooth.

Clinical examination also demonstrated mild inflammation of the peri-implant soft tissues and a cantilevered component of the existing prosthesis that may have contributed to unfavorable biomechanical loading. In the anterior region, the pre-existing crown on tooth #8 had been lost, leaving compromised residual tooth structure. Tooth #8 was therefore incorporated into the subsequent treatment plan for extraction and bone grafting (Figure *2*).

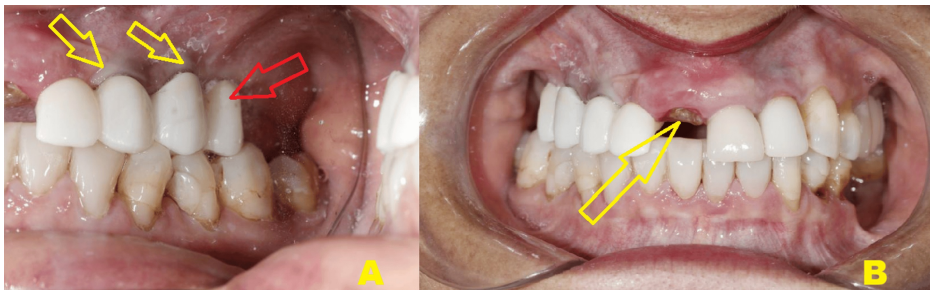


FIGURE 2: Initial Clinical Presentation of the Compromised Maxillary Prosthetic Rehabilitation.

(A) Initial intraoral view of the existing maxillary implant-supported prosthetic rehabilitation. The yellow arrows indicate mild gingival inflammation in the peri-implant regions. The red arrow identifies the cantilevered portion of the existing prosthesis, which may have contributed to unfavorable biomechanical loading of the implant-supported rehabilitation.

(B) Frontal intraoral view after loss of the pre-existing crown on tooth #8, demonstrating the remaining coronal tooth structure (yellow arrow). Because of the compromised condition of the tooth, extraction followed by bone grafting was incorporated into the subsequent treatment plan.

During the initial visit, the patient appeared markedly anxious. After spending approximately 30 minutes in the waiting area, her blood pressure was recorded as 180/110 mmHg, consistent with Stage 2 hypertension according to the 2017 American College of Cardiology/American Heart Association (ACC/AHA) classification. The available clinical documentation did not specify the measurement device, patient position, arm used, standardized resting duration, or whether the recorded value represented a single measurement or an average. Given the markedly elevated blood pressure, the patient's dental anxiety, and the extensive nature of the planned elective procedures, dental treatment was deferred. The patient was informed of the elevated blood pressure and referred for medical evaluation and management of her hypertension and anxiety before proceeding with elective dental treatment. A staged treatment approach was planned to allow reassessment of her systemic condition before surgical and restorative intervention.

The patient returned approximately 15 days later following medical evaluation and management. She

reported taking her prescribed enalapril 10 mg once daily for hypertension. Her blood pressure was 129/85 mmHg. With improvement in her blood pressure, the prosthetic treatment plan was reviewed, and digital scanning was performed as part of the planning and fabrication process for the provisional rehabilitation. Digital visualization was also used to explain the proposed treatment, implant positions, available restorative space, and anticipated rehabilitation to the patient. Given her dental anxiety, this visualization served as a communication tool to improve her understanding and confidence before proceeding with treatment (Figure 3).

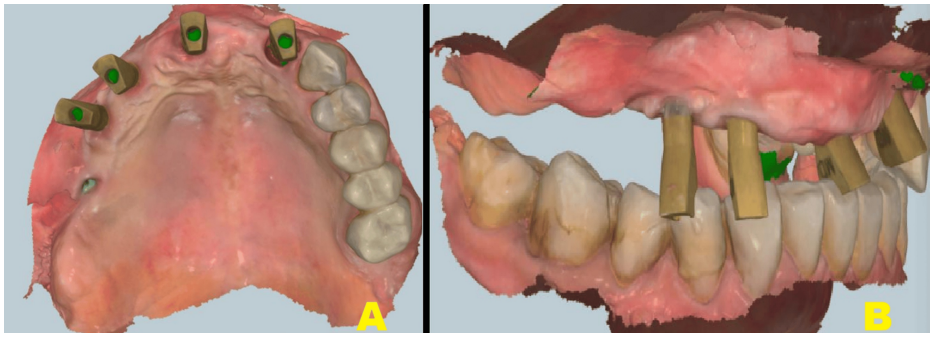


FIGURE 3: Digital Planning of the Implant-Supported Maxillary Rehabilitation.

(A) Occlusal view of the digital treatment plan demonstrating the positions of the existing implants and the planned posterior implant site. The posterior maxillary region was planned for sinus augmentation and regenerative treatment with platelet-rich fibrin (PRF) before implant-supported rehabilitation.

(B) Lateral view of the digital treatment plan demonstrating implant positions in relation to the opposing dentition, allowing evaluation of the available restorative space and anticipated interocclusal relationship. Because the patient presented with dental anxiety, the digital visualization was also used to explain the proposed treatment and anticipated rehabilitation, helping improve her understanding and confidence before proceeding with treatment.

At the subsequent appointment, approximately 15 days later, the patient's blood pressure was 125/89 mmHg. Her systemic status and anxiety were reassessed before treatment, and the planned clinical intervention was initiated. The compromised prosthetic rehabilitation was managed according to the staged treatment plan, with provisional rehabilitation maintained during the healing and surgical phases. Local anesthesia was achieved using 3% mepivacaine hydrochloride (Carbocaine) without epinephrine.

Posterior maxillary support represented an important component of the new treatment plan. The edentulous region corresponding to tooth #3 was evaluated for placement of an additional implant to improve posterior support for the definitive rehabilitation. Because the available posterior maxillary anatomy required augmentation before implant rehabilitation, a maxillary sinus elevation procedure was incorporated into the surgical plan.

Approximately one month into the staged treatment sequence, maxillary sinus augmentation was performed in the region of tooth #3. Autologous PRF was prepared from the patient's blood by centrifugation at a relative centrifugal force of 700 × g for eight minutes and incorporated into the regenerative surgical procedure. A resorbable collagen membrane (Straumann Membrane Plus, Straumann Group) was also used as part of the augmentation protocol. An MIS dental implant measuring 4.2 mm in diameter and 8 mm in length, with a conical connection, standard platform, and titanium alloy (Ti-6Al-4V ELI) composition (MIS Implants Technologies, Shlomi, Israel), was subsequently placed in the region of tooth #3 according to the surgical and prosthetic treatment plan. Tooth #8 was extracted, and the site underwent bone grafting using a bovine-derived xenograft as part of the staged rehabilitation. The surgical site was closed using 4-0 nylon sutures, which were removed 17 days postoperatively. The patient continued with provisional prosthetic rehabilitation during the healing phase.

The case was managed using an interdisciplinary approach involving surgical and prosthetic planning. In addition to management of the implant-supported segment, the definitive restorative plan incorporated the remaining maxillary dentition to improve function, prosthetic integration, and esthetics. Two additional clinicians contributed remotely to treatment planning and discussion of the restorative design. The definitive plan included an implant- and mucosa-supported zirconia prosthesis extending from the #3 to #10 region, zirconia veneers for teeth #11 and #12, and a three-unit zirconia fixed dental prosthesis extending from #13 to #15.

A six-month healing period was allowed before initiation of the definitive restorative phase. At the six-month appointment, the provisional restoration was removed, and the implant sites were clinically

reassessed. Panoramic radiographic evaluation demonstrated the postoperative condition following extraction and bone grafting of the #8 site and the five maxillary implants incorporated into the planned rehabilitation (Figure 4).

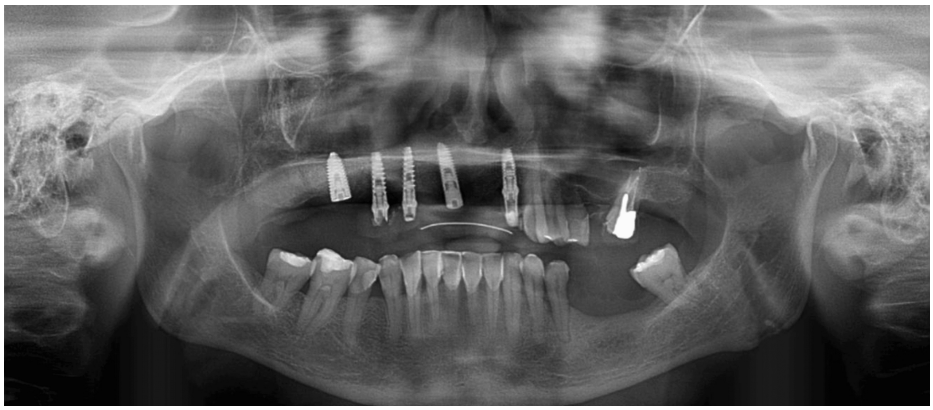


FIGURE 4: Six-Month Panoramic Radiographic Assessment Following Surgical and Implant Rehabilitation.

Panoramic radiograph obtained at the six-month follow-up demonstrating the postoperative and implant rehabilitation status after extraction of tooth #8 and bone grafting of the extraction site. Five maxillary implants are visible as part of the planned rehabilitation extending from the #3 to #10 region. Following the healing period, these implants were incorporated into the treatment plan to support the definitive implant- and mucosa-supported prosthetic rehabilitation.

The definitive restorative procedures were coordinated during a single clinical session lasting approximately four hours. Scan bodies were connected to the implants, and a digital intraoral scan was obtained to record the three-dimensional implant positions for fabrication of the definitive implant and mucosa-supported prosthesis.

During the same four-hour restorative appointment, the necessary clinical procedures and records were completed for the planned zirconia rehabilitation. Teeth #11 and #12 were prepared for zirconia veneers, and the appropriate preparations and restorative records were completed for the three-unit zirconia fixed dental prosthesis extending from #13 to #15. This coordinated appointment allowed the implant-supported and tooth-supported components of the rehabilitation to be integrated within the same definitive restorative plan.

Approximately three and a half weeks after the definitive digital records and tooth preparations were completed, the patient returned for delivery of the definitive prosthetic rehabilitation. The implant- and mucosa-supported zirconia prosthesis extending from the #3 to #10 region was inserted together with the zirconia veneers on teeth #11 and #12 and the three-unit zirconia fixed dental prosthesis extending from #13 to #15. The restorations were evaluated clinically for adaptation, proximal contacts, occlusion, function, and esthetics. Necessary adjustments were performed before completion of the appointment. The completed rehabilitation demonstrated satisfactory clinical integration, function, and esthetic appearance (Figure 5).



FIGURE 5: Final Clinical Outcome Following Comprehensive Implant Prosthetic Rehabilitation.

Final frontal intraoral view following completion of the definitive prosthetic rehabilitation. The maxillary reconstruction consisted of an implant- and mucosa-supported zirconia prosthesis extending from the #3 to #10 region, zirconia veneers on teeth #11 and #12, and a three-unit zirconia fixed dental prosthesis extending from #13 to #15. The completed rehabilitation demonstrated satisfactory clinical integration, occlusal function, and esthetic appearance.

The clinical and surgical phases were performed collaboratively by the treating clinicians, while additional members of the multidisciplinary team contributed to case interpretation and treatment planning.

The patient expressed a high level of satisfaction with the final functional and esthetic result. She specifically reported increased confidence in her smile and perceived the completed rehabilitation as a positive change in her quality of life. The patient was instructed regarding maintenance of the definitive prosthetic rehabilitation and the importance of continued follow-up.

At the three-month follow-up after delivery of the definitive restorations, the patient demonstrated a favorable clinical outcome. The prosthetic rehabilitation remained clinically functional, and the patient continued to report satisfaction with the esthetic and functional results. The three-month assessment supported a favorable short-term outcome following the staged surgical and prosthetic rehabilitation.

Discussion

The present case illustrates the importance of integrating systemic health assessment with surgical and prosthetic decision-making during complex oral rehabilitation. Although the patient initially presented because of a compromised maxillary implant and mucosa-supported prosthetic rehabilitation, the most immediate clinical concern at the first appointment was not the prosthesis itself but the markedly elevated blood pressure of 180/110 mmHg in the presence of significant dental anxiety. This finding changed the sequence of care. Rather than proceeding directly with elective treatment, intervention was postponed, and the patient was referred for medical evaluation and management. This decision emphasizes an important principle in dental practice: successful treatment begins with determining whether the patient can safely undergo the planned procedure before addressing the technical aspects of rehabilitation [15].

Hypertension is particularly relevant in dentistry because patients may present with elevated blood pressure despite having an established diagnosis or receiving antihypertensive therapy. Blood pressure may also fluctuate in association with emotional stress, pain, anxiety, medication adherence, and other physiological factors. Dental procedures can themselves represent a significant source of stress, especially for patients with pre-existing dental anxiety. Activation of the sympathetic nervous system during stressful situations can produce cardiovascular changes, including increases in heart rate and blood pressure [16,17]. Therefore, an elevated reading should be interpreted in the context of the patient's medical history, symptoms, anxiety level, planned procedure, and overall clinical condition rather than viewed only as an isolated numerical value.

In this patient, the initial blood pressure of 180/110 mmHg was identified before extensive elective treatment was initiated. The patient was visibly anxious, and the planned rehabilitation included surgical and prolonged restorative procedures. Elective care was consequently deferred, and medical evaluation was requested. At the subsequent visit approximately 15 days later, following medical evaluation and

management, the patient reported taking enalapril 10 mg orally once daily for hypertension, and her blood pressure was 129/85 mmHg. At a later appointment, a reading of 125/89 mmHg was recorded before treatment proceeded. The improvement in serial measurements allowed the clinical team to continue treatment in a staged manner while maintaining attention to the patient's systemic condition. Importantly, this case should not be interpreted as establishing a universal blood pressure threshold for all dental procedures; clinical decisions must account for the patient's overall cardiovascular status, symptoms, medical recommendations, urgency of treatment, and invasiveness of the planned intervention.

Dental anxiety was another important component of this case. Anxiety may interfere with patient cooperation, increase perceived discomfort, prolong appointments, and contribute to physiological stress responses. Effective management begins with recognition of the patient's anxiety and clear communication regarding the proposed treatment. In this case, digital visualization of the planned rehabilitation was used not only for prosthetic planning but also as a communication tool to explain the proposed treatment sequence, implant positions, restorative space, and anticipated outcome. This approach was intended to improve the patient's understanding and confidence before treatment. Allowing treatment to proceed in stages also provided opportunities for reassessment and reduced the burden associated with completing multiple complex procedures simultaneously. The staged sequence provided time for medical management, provisional treatment, surgical intervention, healing, and definitive prosthetic rehabilitation rather than attempting to complete treatment while the patient's systemic condition remained inadequately controlled. Although dental anxiety was clinically observed and considered during treatment planning, its severity was not assessed using a validated instrument, such as the Modified Dental Anxiety Scale (MDAS). This represents a limitation in the objective assessment of the patient's anxiety.

Local anesthetic selection also formed part of the individualized clinical approach. Mepivacaine without epinephrine was used during treatment. Vasoconstrictor use in patients with cardiovascular disease requires consideration of the patient's medical status, anticipated procedure, potential drug interactions, and the benefits of obtaining profound anesthesia [18,19]. Although avoidance of epinephrine should not be presented as mandatory for every patient with hypertension, the anesthetic plan in this case was selected in the context of the patient's history, initial markedly elevated blood pressure, anxiety, and planned surgical treatment. Adequate pain control remains important because pain itself may contribute to endogenous catecholamine release and physiological stress [20].

Once the patient's systemic condition permitted elective treatment, attention shifted to the biological, biomechanical, and prosthetic problems associated with the existing rehabilitation. Clinical and radiographic evaluation demonstrated four pre-existing maxillary implants, peri-implant bone loss, gingival inflammation, compromised residual tooth structure at #8 following loss of the pre-existing crown, and a cantilevered component of the existing prosthesis. The cantilever was considered a potential source of unfavorable biomechanical loading; however, a direct causal relationship between the cantilever and the observed peri-implant bone loss cannot be established from this single case [20]. Peri-implant inflammatory conditions and progressive supporting bone loss can compromise the long-term stability of implant rehabilitation and require careful clinical and radiographic assessment before a definitive prosthetic plan is established. In a complex rehabilitation, replacement of the prosthesis alone may be insufficient if underlying biological, structural, and biomechanical deficiencies are not addressed.

Previous research has investigated the potential influence of hypertension on dental implant outcomes, particularly in relation to bone metabolism, microvascular circulation, osseointegration, and long-term implant survival. Hypertension may affect vascular remodeling and bone metabolism, raising concerns regarding its possible influence on peri-implant tissue healing and implant integration. However, the available clinical evidence does not establish hypertension as an independent risk factor for dental implant failure. In a systematic review and meta-analysis published in 2024, Hamadé et al. evaluated 24 studies involving 4,874 implants placed in hypertensive patients and 16,192 implants placed in normotensive patients. The analysis identified 257 implant failures in hypertensive patients and 809 failures in normotensive patients, with no statistically significant difference in implant failure risk between the groups (odds ratio [OR] = 1.10; p = 0.671). The authors emphasized the need for further investigations with more rigorous hypertension classification and clearer documentation of antihypertensive treatment [21]. These findings suggest that hypertension alone should not be considered a definitive predictor of implant failure, although appropriate cardiovascular assessment and medical management remain essential when planning invasive dental procedures.

The staged surgical treatment also included extraction of the compromised tooth #8 and bone grafting of the extraction site. This procedure was incorporated into the overall reconstructive sequence before definitive prosthetic rehabilitation. The posterior maxillary region presented an additional challenge. Placement of an additional implant in the #3 region was planned to improve posterior support for the new rehabilitation. However, the available anatomy required maxillary sinus augmentation. Sinus floor elevation is a commonly employed approach for increasing bone availability in the posterior maxilla when residual bone dimensions are inadequate for the planned implant position [22,23]. In this case, sinus augmentation was performed in the #3 region as part of the staged surgical treatment, with autologous PRF and a collagen membrane incorporated into the regenerative protocol, followed by placement of an MIS implant. Placement of this additional implant resulted in a total of five maxillary implants incorporated into the subsequent

rehabilitation plan.

PRF is an autologous platelet concentrate derived from the patient's blood and has been used in oral surgical and regenerative procedures because its fibrin matrix contains platelets and other cellular and molecular components involved in wound healing [24,25]. However, the favorable outcome in this case cannot be attributed to PRF alone. Healing following sinus augmentation and implant placement is multifactorial and depends on factors including surgical technique, local anatomy, vascular supply, implant stability, patient-related factors, and postoperative healing. Similarly, the collagen membrane formed one component of the surgical protocol rather than an independent explanation for the clinical outcome. This distinction is important because a single case report cannot establish the superiority of one regenerative material or technique.

In this case, a six-month healing interval was allowed following the surgical procedures before initiation of the definitive restorative phase. This interval was incorporated into the staged treatment plan to allow postoperative healing before proceeding with definitive prosthetic rehabilitation. After this period, the provisional restoration was removed, and the implant sites were clinically and radiographically reassessed. The five maxillary implants were incorporated into the definitive rehabilitation plan, and their positions were transferred digitally using scan bodies and intraoral scanning. Digital implant impressions can facilitate prosthetic workflows by recording implant positions and supporting the digital design and fabrication of implant-supported restorations [26,27]. In this case, the digital implant workflow was integrated with treatment of the natural dentition rather than performed as an isolated implant procedure.

An important feature of this rehabilitation was the interdisciplinary coordination of the definitive prosthetic phase. During a single clinical session lasting approximately four hours, digital implant records were obtained, and the restorative procedures required for the definitive rehabilitation were performed. The treatment plan incorporated an implant and mucosa-supported zirconia prosthesis extending from the #3 to #10 region, zirconia veneers on teeth #11 and #12, and a three-unit zirconia fixed dental prosthesis extending from #13 to #15. Coordinating these components within the same restorative plan allowed the clinicians to evaluate the relationship among implant position, tooth-supported restorations, occlusion, function, and esthetics. Complex rehabilitation is therefore not simply a collection of individual procedures; successful integration requires consideration of the entire dentition and the patient's functional and esthetic objectives.

The definitive restorations were delivered approximately three and a half weeks after the restorative records and preparations were completed. Clinical evaluation included assessment of prosthetic adaptation, proximal contacts, occlusion, function, and esthetics. The patient reported a high level of satisfaction with the final rehabilitation and increased confidence in her smile. At the three-month follow-up, the rehabilitation continued to demonstrate a favorable short-term clinical outcome, and the patient remained satisfied with both function and esthetics. Patient-reported satisfaction is relevant in comprehensive oral rehabilitation because successful treatment encompasses not only biological and mechanical outcomes but also the patient's perception of function, appearance, and quality of life [28-30].

Nevertheless, the three-month follow-up represents a short observation period and does not establish the long-term stability or survival of the implant-supported and tooth-supported restorations. Longer-term clinical and radiographic follow-up is necessary to evaluate peri-implant tissue health, marginal bone stability, prosthetic integrity, and the durability of the functional and esthetic outcomes. Furthermore, the findings of this single case cannot be generalized to all patients with hypertension or dental anxiety.

Conclusions

This case highlights the importance of integrating systemic health assessment with surgical and prosthetic planning in patients with hypertension and dental anxiety requiring complex oral rehabilitation. The initial blood pressure prompted postponement of elective dental treatment and referral for medical evaluation. Following medical management and improvement in blood pressure, treatment proceeded through a staged interdisciplinary approach incorporating continued assessment of the patient's systemic condition and dental anxiety.

The rehabilitation included maxillary sinus augmentation, placement of an additional implant in the #3 region, a six-month healing period, digital implant impressions using scan bodies, and comprehensive zirconia prosthetic reconstruction. At the three-month follow-up, the patient demonstrated a favorable short-term clinical outcome and reported satisfaction with the functional and esthetic results. This case emphasizes the importance of medical coordination, careful treatment sequencing, and individualized patient management. Nevertheless, longer-term follow-up is necessary to assess the stability and durability of the rehabilitation.

Additional Information

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All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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, 8:111-20. 10.2147/CCIDE.S99446
2. Bavitz JB: Dental management of patients with hypertension . Dent Clin North Am. 2006, 50:547-62, vi. 10.1016/j.cden.2006.06.003
3. Nath S, Jiang T, Barrow J, Simon L: Treatment deferral for elevated blood pressure at a dental school clinic . J Dent Educ. 2024, 88:51-5. 10.1002/jdd.13369
4. Hogan J, Radhakrishnan J: The assessment and importance of hypertension in the dental setting . Dent Clin North Am. 2012, 56:731-45. 10.1016/j.cden.2012.07.003
5. Gupta K, Kumar S, Anand Kukkamalla M, et al.: Dental management considerations for patients with cardiovascular disease—a narrative review. Rev Cardiovasc Med. 2022, 23:261. 10.31083/j.rcm2308261
6. Roccuzzo A, Imber JC, Salvi GE, Roccuzzo M: Peri-implantitis as the consequence of errors in implant therapy. Periodontol 2000. 2023, 92:350-61. 10.1111/prd.12482
7. Dreyer H, Grischke J, Tiede C, et al.: Epidemiology and risk factors of peri-implantitis: a systematic review . J Periodontal Res. 2018, 53:657-81. 10.1111/jre.12562
8. Ghodsian D, D'Jesús S, Sánchez-Labrador L, Cobo-Vázquez CM, Cortés-Bretón Brinkmann J, Martínez-González JM, Meniz-García C: Maxillary sinus augmentation with autogenous tooth grafting material: a systematic review. Biomimetics (Basel). 2024, 9:518. 10.3390/biomimetics9090518
9. Al-Moraissi E, Alhajj WA, Al-Qadhi G, Christidis N: Bone graft osseous changes after maxillary sinus floor augmentation: a systematic review. J Oral Implantol. 2022, 48:464-71. 10.1563/aaid-joi-D-21-00310
10. Ali S, Bakry SA, Abd-Elhakam H: Platelet-rich fibrin in maxillary sinus augmentation: a systematic review . J Oral Implantol. 2015, 41:746-53. 10.1563/aaid-joi-D-14-00167
11. Malcangi G, Patano A, Palmieri G, et al.: Maxillary sinus augmentation using autologous platelet concentrates (platelet-rich plasma, platelet-rich fibrin, and concentrated growth factor) combined with bone graft: a systematic review. Cells. 2023, 12:1797. 10.3390/cells12131797
12. Ma J, Zhang B, Song H, Wu D, Song T: Accuracy of digital implant impressions obtained using intraoral scanners: a systematic review and meta-analysis of in vivo studies. Int J Implant Dent. 2023, 9:48. 10.1186/s40729-023-00517-8
13. Mohajerani R, Djalalinia S, Alikhasi M: The effects of scan body geometry on the precision and the trueness of implant impressions using intraoral scanners: a systematic review. Dent J (Basel). 2025, 13:252. 10.3390/dj13060252
14. Whelton PK, Carey RM, Aronow WS, et al.: 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: Executive Summary: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Hypertension. 2018, 71:1269-324. 10.1161/HYP.0000000000000066
15. Sharma A, Pant R, Priyadarshi S, Agarwal N, Tripathi S, Chaudhary M: Cardiovascular changes due to dental anxiety during local anesthesia injection for extraction. J Maxillofac Oral Surg. 2019, 18:80-7. 10.1007/s12663-018-1085-4
16. De Felice M, de Carvalho Moreno das Neves V, Almeida-Leite CM, Majid A, Fontes MA: Autonomic cardiovascular mechanisms linked to stress in dental practice. Br Dent J. 2026, 240:395-402. 10.1038/s41415-025-9459-8

17. Bader JD, Bonito AJ, Shugars DA: A systematic review of cardiovascular effects of epinephrine on hypertensive dental patients. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2002, 93:647-53. 10.1067/moe.2002.123866
18. Essado AG, Dias DM, Silva GT, Gonçalves LS, Geraldo Martins VR, Galo R, Pinto MR: Use of epinephrine combined with dental anesthetics in hypertensive patients during dental treatment. J Clin Exp Dent. 2026, 18:e600-4. 10.4317/jced.63825
19. Tsuchihashi T, Takata Y, Kurokawa H, Miura K, Maruoka Y, Kajiyama M, Fujishima M: Blood pressure response during dental surgery. Hypertens Res. 1996, 19:189-94. 10.1291/hypres.19.189
20. Vieira FL, Fontenele MN, de Souza LM, Berteli TS, Rodrigues RC, Bordini EA, Santiago Junior JF: Implant-supported cantilever fixed partial dentures in the posterior region: a systematic review and meta-analysis on survival outcomes. Materials (Basel). 2025, 18:4704. 10.3390/ma18204704
21. Hamadé L, El-Disoki S, Chrcanovic BR: Hypertension and dental implants: a systematic review and meta-analysis. J Clin Med. 2024, 13:499. 10.3390/jcm13020499
22. Del Fabbro M, Corbella S, Weinstein T, Ceresoli V, Taschieri S: Implant survival rates after osteotome-mediated maxillary sinus augmentation: a systematic review. Clin Implant Dent Relat Res. 2012, 14 Suppl 1:e159-68. 10.1111/j.1708-8208.2011.00399.x
23. Reis GG, Denardi RJ, de Souza SL, et al.: Sinus floor elevation with platelet-rich fibrin from horizontal centrifugation and xenograft: randomized clinical trial. Clin Implant Dent Relat Res. 2025, 27:e70093. 10.1111/cid.70093
24. Powell CA, Casarez-Quintana A, Zellner J, Al-Bayati O, Font K: The application of leukocyte- and platelet-rich fibrin (L-PRF) in maxillary sinus augmentation. Clin Adv Periodontics. 2022, 12:277-86. 10.1002/cap.10216
25. Babich O, Lugassy E, Babich M, Abayov P, Haimov E, Juodzbalys G: The use of platelet-rich fibrin in sinus floor augmentation surgery: a systematic review. J Oral Maxillofac Res. 2024, 15:e1. 10.5037/jomr.2024.15201
26. Gehrke P, Rashidpour M, Sader R, Weigl P: A systematic review of factors impacting intraoral scanning accuracy in implant dentistry with emphasis on scan bodies. Int J Implant Dent. 2024, 10:20. 10.1186/s40729-024-00543-0
27. Seth C, Bawa A, Gotfredsen K: Digital versus conventional prosthetic workflow for dental students providing implant-supported single crowns: a randomized crossover study. J Prosthet Dent. 2024, 131:450-6. 10.1016/j.prosdent.2023.03.031
28. Dings JP, Merkx MA, de Clonie Maclennan-Naphausen MT, van de Pol P, Maal TJ, Meijer GJ: Maxillofacial prosthetic rehabilitation: a survey on the quality of life. J Prosthet Dent. 2018, 120:780-6. 10.1016/j.prosdent.2018.03.032
29. Duong HY, Roccuzzo A, Stähli A, Salvi GE, Lang NP, Sculean A: Oral health-related quality of life of patients rehabilitated with fixed and removable implant-supported dental prostheses. Periodontol 2000. 2022, 88:201-37. 10.1111/prd.12419
30. Coltro M, Villarinho EA, Ozkomur A, Shinkai RS: Long-term impact of implant-supported oral rehabilitation on quality of life: a 5 years prospective study. Aust Dent J. 2022, 67:172-7. 10.1111/adj.12906