BIOSCIENCE JOURNAL

ADJUVANT THERAPY IN OSTEORADIONECROSIS MANAGEMENT: CASE REPORTS

Laura Maria do Santos Reis Rocha de CASTRO[1], Lívia Bonjardim LIMA[2], Luiz Fernando Barbosa de PAULO[3], Antônio Pires da SILVA-NETO[4], Priscilla Barbosa Ferreira SOARES[5]

[1]Graduate Program in Dentistry, Universidade Federal de Uberlândia, Uberlândia, Minas Gerais, Brazil.
[2]Department of Oral and Maxillofacial Surgery, Dental School, Universidade Federal de Uberlândia, Uberlândia, Minas Gerais, Brazil.
[3]Oral and Maxillofacial Surgeon at the Dental Hospital of the Universidade Federal de Uberlândia, Uberlândia, Minas Gerais, Brazil.
[4]Department of Oral and Maxillofacial Surgery, Centro Universitário Mário Palmério, Uberlândia, Minas Gerais, Brazil.
[5]Department of Periodontology and Implantology, Dental School, Universidade Federal de Uberlândia, Uberlândia, MG, Brazil

How to cite: CASTRO, L.M.S.R.R., et al. Adjuvant therapy in osteoradionecrosis management: case reports. *Bioscience Journal*. 2026, **42**, e42009. https://doi.org/10.14393/BJ-v42n0a2026-79937

Abstract

Osteoradionecrosis is a chronic complication of head and neck radiotherapy. It is characterized by necrotic bone exposure in previously irradiated areas. The clinical manifestations range from asymptomatic bone exposure to severe infections and pathological fractures. We report the clinical outcomes of adjunctive therapies for osteoradionecrosis management. Three male patients diagnosed with osteoradionecrosis following head and neck radiotherapy underwent treatment with a weekly ozone therapy protocol that included ozonated water irrigation, gas infiltration, and topical ozonated oil application. One patient with severe disease required a combination of surgical debridement and platelet-rich fibrin membrane placement. All the patients demonstrated progressive epithelialization, infection control, and accelerated wound healing. These results suggest that ozone therapy is a valuable strategy for enhancing tissue regeneration and improving wound healing, whether used alone or in combination with surgical procedures and platelet-rich fibrin. Altogether, these findings reinforce the potential of multimodal approaches in the clinical management of osteoradionecrosis.

Keywords: Osteoradionecrosis. Ozone. Platelet-rich fibrin. Radiotherapy.

Corresponding author:
Priscilla Barbosa Ferreira Soares
pbfsoares@ufu.br

Received: 01 October 2025
Accepted: 02 February 2026
Published: 06 April 2026

1. Introduction

Osteoradionecrosis (ORN) is a chronic complication of radiotherapy for head and neck malignancies (Manzano et al. 2019). It is characterized by persistent bone necrosis in the irradiated area (Manzano et al. 2019; Jin et al. 2020). It may occur spontaneously or following surgical trauma, and can present with fistulas, periodontal communication, or radiographic changes, even in the absence of visible bone exposure (Manzano et al. 2019; Harris et al. 2022). Although it can be asymptomatic and manageable with conservative treatment, it can progress to extensive necrosis, pathological fractures, and secondary

infections in severe cases (Beaumont et al. 2021). Clinical examination may reveal mucosal ulceration with bone exposure, highlighting the significance of early diagnosis to rule out tumor recurrence and determine the need for surgical intervention (Manzano et al. 2019; Yilmaz et al. 2023). The increasing prevalence of ORN has prompted research on devising effective treatments (Yilmaz et al. 2023), including antibiotics (Yilmaz et al. 2023), sequestrectomy (Manzano et al. 2019; Beaumont et al. 2021), hyperbaric oxygen therapy (Manzano et al. 2019), surgical resection (Jin et al. 2020), ozone therapy (Suh et al. 2019), and platelet-rich fibrin (PRF) therapy (Vorakulpipat et al. 2023).

Ozone therapy demonstrates regenerative potential and promotes wound healing, thereby facilitating early closure of acute and chronic wounds (Suh et al. 2019). Its antimicrobial efficacy is attributed to its ability to modulate biological oxidative stress, which affects a wide range of microorganisms (Borges et al. 2017; Akdeniz et al. 2018; Suh et al. 2019). Topical applications display beneficial immunological effects and the potential for adequate oxygenation, which can be achieved using ozonated water, gas, and ozonated oil (Xiao et al. 2017; Romary et al. 2023). Similarly, PRF has emerged as a promising modality for enhancing repair processes in ORN (Vorakulpipat et al. 2023). PRF is derived from the patient's own blood and is completely biocompatible and contains intrinsic growth factors that promote angiogenesis (Baca-Gonzalez et al. 2022). It optimizes tissue repair by stimulating cell proliferation, differentiation, and activity (Baca-Gonzalez et al. 2022; Vorakulpipat et al. 2023).

A combination of ozone therapy and PRF offers a promising biological rationale for treating ORN (Suh et al. 2019; Cecerska-Heryć et al. 2022; Vorakulpipat et al. 2023; Veneri et al. 2024). Ozone therapy promotes local oxygenation, improves tissue perfusion, and exhibits antimicrobial and anti-inflammatory effects (Veneri et al. 2024). PRF provides a matrix rich in autologous growth factors that stimulate angiogenesis, fibroblast activity, and tissue regeneration (Cecerska-Heryć et al. 2022). These therapies can optimize wound healing in hypoxic and poorly vascularized tissues, such as those affected by ORN (Cecerska-Heryć et al. 2022; Veneri et al. 2024).

Despite the growing interest in adjunctive therapies for ORN, standardized treatment protocols are scarce, reflecting the absence of a consensus on the most effective strategies in clinical practice (Fritz et al. 2025). Although ozone therapy and PRF have been studied separately, reports on their combined use in consecutive patients following a consistent protocol remain rare.

We present three clinical cases of ORN of varying severity following head and neck radiotherapy, highlighting the outcomes of ozone therapy, either as a standalone treatment or in combination with surgical intervention and PRF therapy.

2. Case Presentation

These case reports were compiled following the Surgical CAse REport (SCARE) checklist (Kerwan et al. 2025). The research protocol was approved by the Research Ethics Committee (REC) (CAAE: 64415522.0.0000.5152; Approval No.: 5.769.001).

Case 1

A 57-year-old man, previously treated with 70 Gy radiotherapy in 35 fractions for metastatic neck cancer of occult origin, developed stage II ORN (Store and Boysen 2000) of the hard palate following surgical excision of a secondary squamous cell carcinoma (SCC). Clinical findings included a 2 cm palatal bone exposure and a fistula between the palatal and vestibular regions (Figure 1A-B) without signs of infection.

The ozone therapy protocol was performed weekly and determined based on the patient's clinical condition and the absence of signs of infection. The protocol included irrigation with ozonated water, ozonated oil, and gas. Ozonated water promotes mechanical cleansing and initiates a low-dose stimulus, creating a more receptive environment for therapy. The infiltration of gas enhances the therapeutic effects, whereas the application of ozonated oil provides a sustained release of ozone, increasing the durability and effectiveness of the treatment. The solution was prepared using 500 mL of deionized water subjected to an ozonation protocol with an ozone concentration of 60 µg/mL for 5 min, and ozonated water was used immediately after preparation, resulting in a final concentration of 15 µg/mL in water. The water was cooled to 5.5°C before the procedure, and ozonation was performed using an ozone generator (Medplus V,

Philozon™; Santa Catarina, Brazil). In addition, a 3-mL infiltration of gas at a concentration of 15 µg/mL was administered at three perilesional points, using 1 mL at each point. This treatment was combined with the subsequent topical application of ozonated sunflower oil (Philozon, Brazil), characterized by a peroxide index exceeding 2500 meq/1000 g. Ozonized oil was administered to the patient with instructions to apply it once daily until the doctor advised to stop the therapy. The recommended dosage is two to three drops applied directly to the area affected by ORN, and the product should be stored in a refrigerated place.

Two months later, the patient presented with a bone sequestrum in the palatal region that could be easily detached, facilitating atraumatic removal. Following 1 year of bi-weekly ozone therapy and clinical follow-up (Figure 1C-D), the wound underwent complete epithelialization in the area of communication between the palatal ridge and the vestibular surface of the maxillary ridge. The patient reported no pain or signs of inflammation (Figure 2).

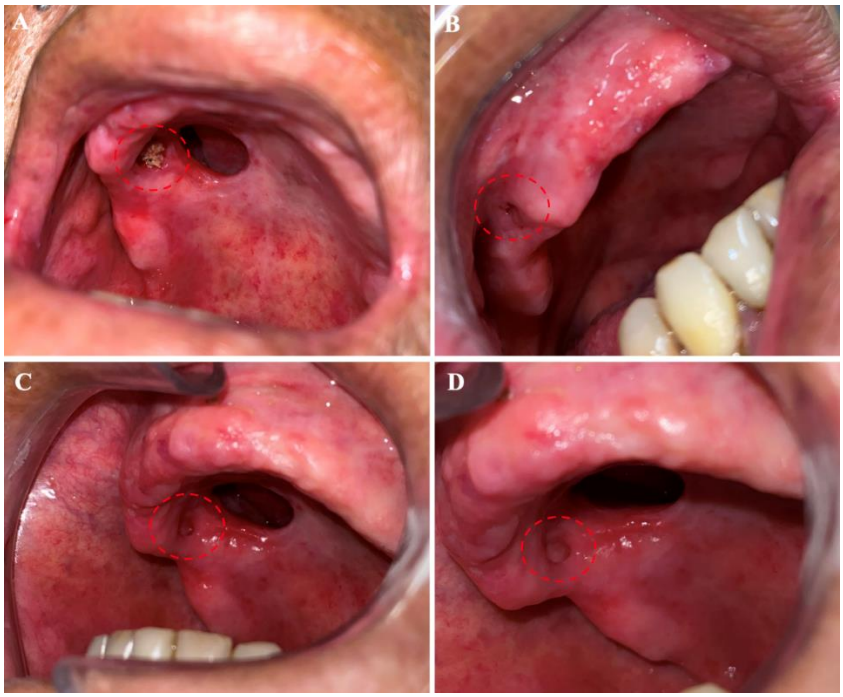

Figure 1. A–D. Intraoral view of the hard palate. (A) Bone exposure with buccal nasal communication, (B) vestibular fistula, (C) complete epithelialization, and (D) magnified view of palatal fistula.

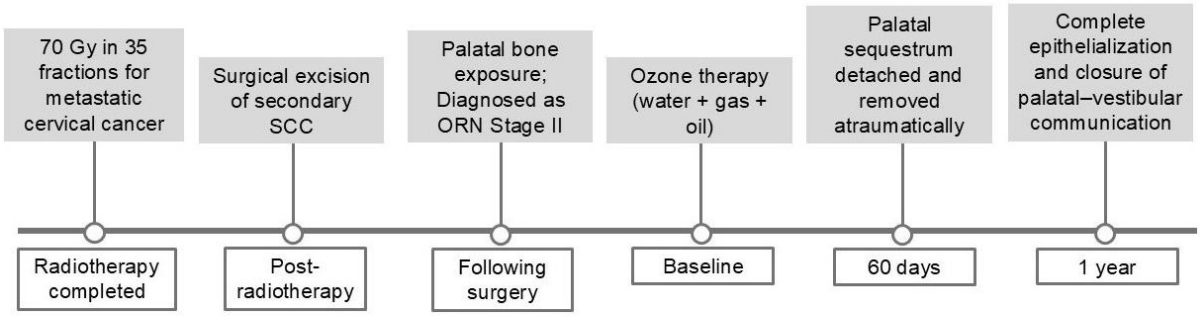

Figure 2. Timeline of case 1.

Case 2

A 67-year-old man with leukoderma and a history of SCC of the soft palate received radiotherapy at a total dose of 72 Gy over 2 months. Eight months after completion of radiotherapy, tooth 38 was extracted. The patient reported persistent pain and failure to heal, and therefore was referred to a specialist dental team with experience in post-radiotherapy management. Clinical examination revealed bone exposure at the extraction site (Figure 3A). Panoramic radiography (Figure 3B) revealed radiolucency in the alveolar crest region consistent with stage II ORN (Store and Boysen 2000).

Initial treatment consisted of weekly ozone therapy, including irrigation with 60 mL of ozonated water (60 µg/mL), perilesional infiltration of 3 mL of gas at 15 µg/mL (Figure 3C), and topical ozonated oil. The patient was instructed to apply the oil once daily at home. After 1 year, complete epithelialization was observed. However, 3 months later, the patient presented with a 1.5 cm bone exposure and an 8 mm bone sequestrum, which was removed atraumatically (Figure 3D). Irrigation with ozonated water was maintained during the surgical procedure, and gas and ozonated oil were applied topically after suturing. Radiographic progression of the lesion was observed despite the absence of an infection (Figure 3E).

Surgical debridement was performed under local anesthesia (figure 3F-G) with continued intraoperative ozone therapy. This was followed by placing an advanced PRF (A-PRF) membrane (Figure 3H). Amoxicillin (500 mg) was prescribed every 8 h for 3 days preoperatively and continued for 7 days postoperatively. Weekly ozone sessions were resumed after surgery. Complete wound closure and epithelialization were achieved 1 month after surgery (Figure 3I). The patient remained asymptomatic during 2 years of follow-up (Figure 3J) and received ozone therapy every 6 months. No new exposure or signs of infection were observed, and the radiographs revealed a stable bone structure with evidence of healing (Figure 3K). Histopathological examination of the debrided tissue revealed necrotic bone with signs of inflammation and remodeling (Figure 3L). The timeline for this case is shown in Figure 4.

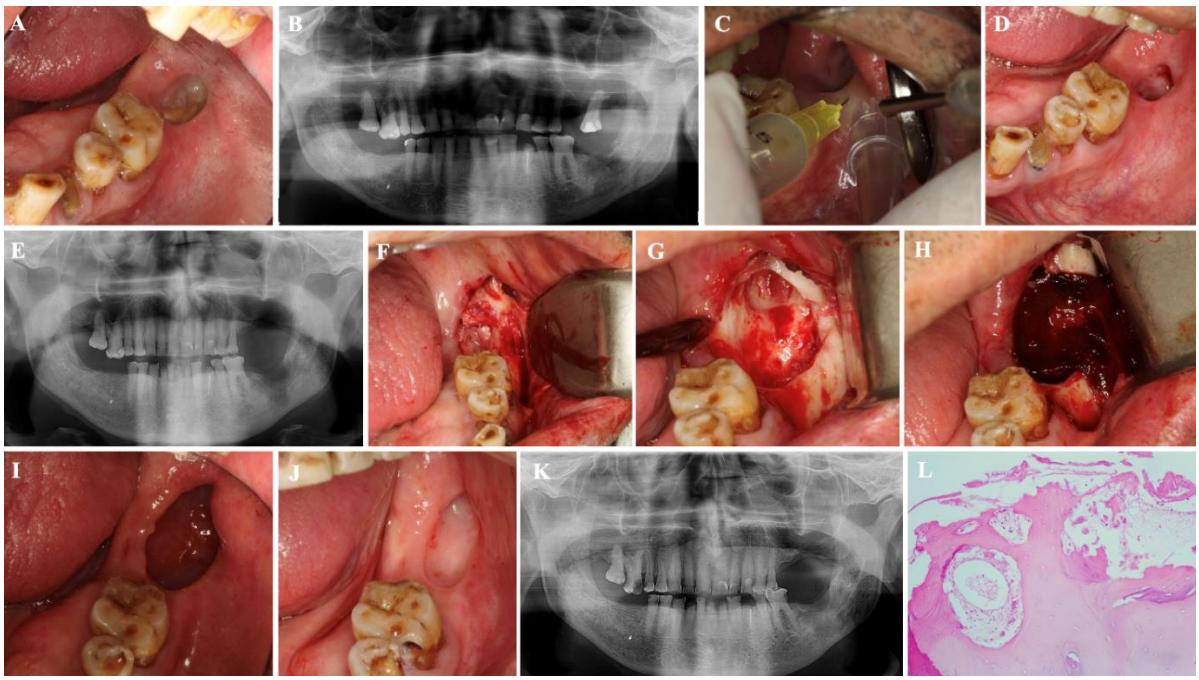

Figure 3. A–L. Clinical and radiographic follow-up of osteoradionecrosis (ORN) in the mandibular region. (A) Exposed bone in a poorly sealed socket after extraction. (B) Radiolucency in the region of tooth 38. (C) Ozone therapy with perilesional gas infiltration. (D) Epithelialization of the alveolus. (E) Increased radiolucency. (F) Bone sequestrum requiring surgical removal. (G) Debridement of the necrotic bone. (H) A-PRF membrane application. (I–J) Postoperative healing after 1 and 12 months. (K) Radiograph at 2-year follow-up. (L) Histological image of the devitalized bone displaying eroded surface, osteoclast activity, empty lacunae, and absence of osteoblasts.

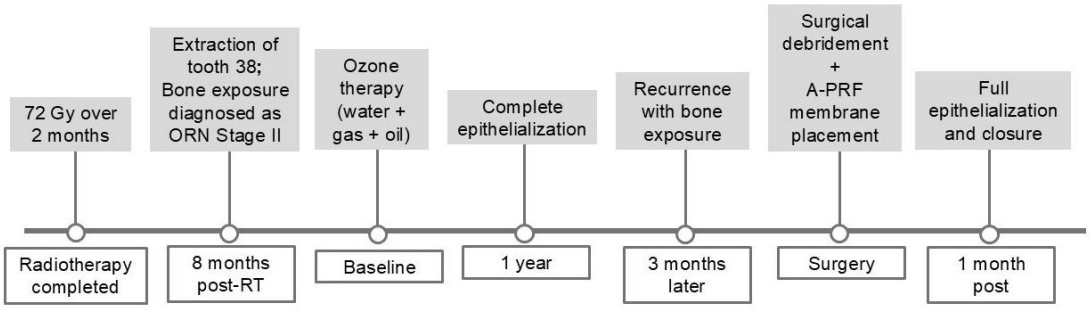

Figure 4. Timeline of case 2.

Case 3

A 48-year-old man with melanoderma was referred to our hospital for dental evaluation after radiotherapy and chemotherapy for SCC at the base of the tongue. The patient was administered 70 Gy in 35 fractions. After treatment completion, spontaneous exposure of the necrotic bone occurred both intraorally and through the submandibular skin, with extensive necrosis of the right mandible and bone exposure involving the body and base of the mandible measuring approximately 7 cm in length. The area appeared eroded, darkened, and caused severe pain, foul odor, and purulent drainage (Figure 5A-B), consistent with stage III ORN (Store and Boysen 2000). Panoramic radiography revealed bone rarefaction involving the mandibular parasymphysis, body, angle, and right ramus (Figure 5C). The initial treatment included ozone therapy as an adjunct to treat the infection, and definitive surgical planning was in progress.

The ozone therapy protocol included intra- and extraoral, weekly wound irrigation using 100 mL of ozonated water, prepared as in Case 1. In addition, 5 mL of gas at 60 µg/mL was applied at multiple points around the lesion. In addition, ozonized oil was topically applied daily during visits and at home. The pain improved gradually after 3 weeks, with reduced purulent discharge and foul odor. However, the patient developed a pathological mandibular fracture requiring urgent surgical intervention under general anesthesia. Hemimandibulectomy was performed using submandibular and retromandibular approaches (Figure 5D-G). Tracheostomy was performed to maintain the airway. Dehiscence of the extraoral surgical wound occurred on the second postoperative day (Figure 5H-I). The excised specimen was sent for histopathological examination (Figure 5J-K), and ORN was diagnosed.

Ozone therapy was maintained to improve tissue quality during the postoperative period. At this point, infiltration with gas at 15 µg/mL was performed due to the absence of infection. After 8 months, the remaining open area was closed with a pectoralis major myocutaneous flap (Figure 5L-M), which progressed with good healing without wound dehiscence or signs of infection (Figure 5N). The surgical wound maintained a good scar appearance 1 year postoperatively (Figure 5O). Figure 6 illustrates the timeline for this case.

All three patients demonstrated progressive mucosal healing with ozone therapy, indicating infection control and gradual epithelialization (Table 1). The combination of ozone therapy with the A-PRF membrane caused rapid and more effective tissue regeneration, particularly in cases requiring surgical debridement.

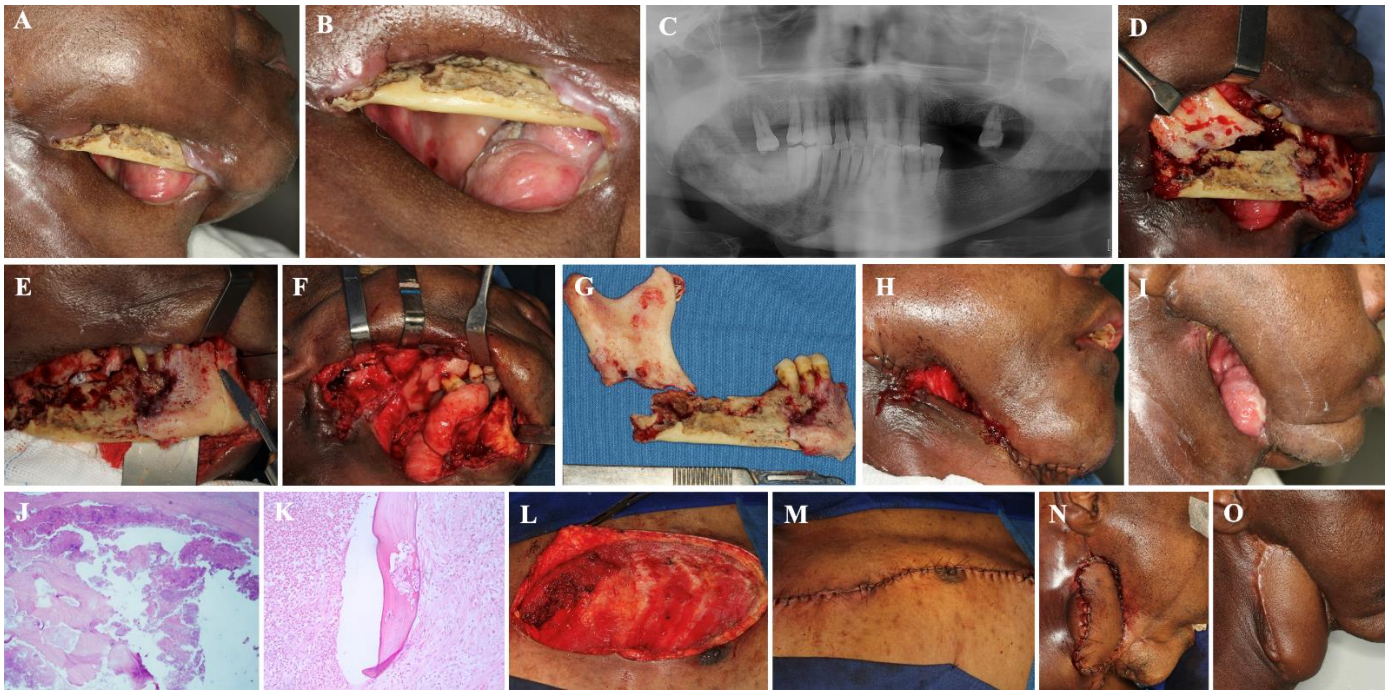

Figure 5. A–O. Clinical, radiographic, and surgical management of advanced osteoradionecrosis (ORN) in the mandible. (A) Extraoral bone exposure. (B) Magnified view revealing intraoral structures. (C) Panoramic radiograph showing bone rarefaction. (D–G) Steps of hemimandibulectomy, including resection of the necrotic bone. (H–I) Postoperative wound dehiscence. (J–K) Histopathology showing the necrotic bone and inflammation (hematoxylin–eosin staining). (L–M) Rotation and suturing of the pectoralis major flap. (N–O) Flap positioning in immediate and 1-year follow-up.

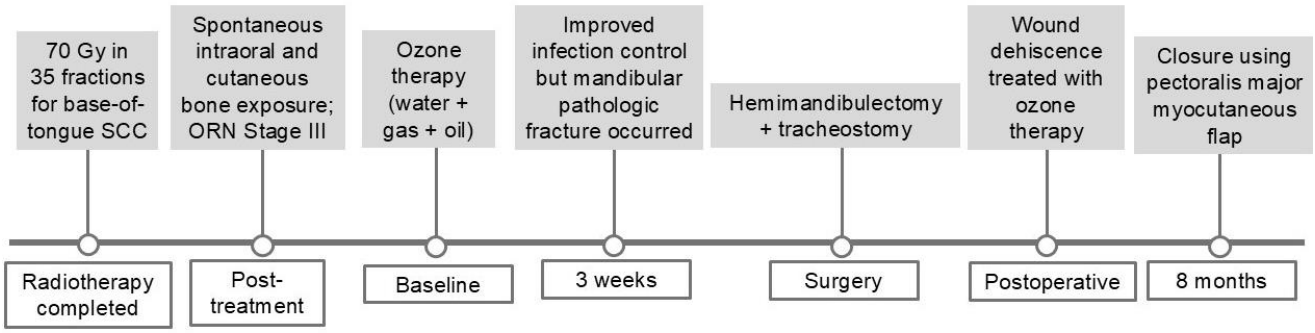

Figure 6. Timeline of case 3.

Table 1. Clinical summary and outcomes of osteoradionecrosis cases.

Case	ORN stage	Surgical intervention	Adjunctive therapy	Ozone sessions	Healing time	Recurrence	Overall outcome	Follow-up time
CASE 1	II	Spontaneous sequestrum removal	Ozone therapy*	Weekly (1 year)	12 months	No	Complete epithelialization; no pain or inflammation.	1 year
CASE 2	II	Surgical debridement	Ozone therapy* + A-PRF	Weekly + biannual	~ 17 months	Yes	Stable over 2 years, with radiographic evidence of bone healing.	2 years
CASE 3	III	Hemimandibulectomy + flap reconstruction	Ozone therapy*	Weekly + postoperative	Flap closure at 8 months; full healing at 12 months.	No	Good healing with flap; no signs of infection.	1 year

*Ozone therapy included ozonated water irrigation, gas infiltration, and topical application of ozonated oil.

4. Discussion

The management of ORN requires an individualized approach tailored to the severity of the disease (He et al. 2015; Manzano et al. 2019; Jin et al. 2020). Clinical staging plays a crucial role in guiding treatment decisions (Jin et al. 2020). Store and Boysen (2000) proposed a four-stage system: stage 0 included mucosal changes without radiographic findings; stage 1 included radiographic signs of necrosis with intact mucosa; stage 2 included bone exposure without infection; and stage 3 included the exposed necrotic bone with infection, fistulae, or pathological fractures.

In the early stages, a conservative approach was used in combination with different therapies, including debridement of the non-vital bone, systemic antibiotics, hyperbaric oxygen therapy, laser therapy, ozone therapy, and PRF therapy (Suh et al. 2019; Beaumont et al. 2021; Vorakulpipat et al. 2023). However, advanced cases, characterized by skin fistulas, extensive mandibular bone involvement, and pathological fractures, required more invasive approaches, such as complete resection of the affected mandible and surrounding necrotic soft tissue, and reconstruction of soft and hard tissue defects (Jin et al. 2020; Harris et al. 2022).

Mechanisms of action of ozone and PRF therapies

One of the objectives of ozone therapy in dentistry is to induce controlled oxidative stress using low concentrations of ozone while maintaining high therapeutic efficacy (Akdeniz et al. 2018; Suh et al. 2019; Romary et al. 2023). The adopted ozone therapy protocol is based on maximizing therapeutic properties by targeting the body's response (Suh et al. 2019). Ozone concentrations between 10 and 40 μg/mL are used for topical applications, which have been proven effective in promoting analgesic and anti-inflammatory effects, as well as accelerating the healing process (Akdeniz et al. 2018; Da Silva et al. 2024). A concentration of 60 μg/mL of ozone has demonstrated positive effects on wound healing and cellular response in oral tissues. The duration of treatment varies according to individual needs and extends to complete healing of the infection (Da Silva et al. 2024).

Different modalities of ozone therapy in dentistry, including water, gas, and oil, are characterized by their practicality and versatility, allowing for easy adaptation to different clinical scenarios (Suh et al. 2019). From a therapeutic point of view, ozone therapy is characterized by its anti-inflammatory and antiseptic properties as well as its ability to modulate oxidative stress, resulting in improved oxygenation and stimulation of local circulation (Borges et al. 2017). The therapy facilitates tissue repair, promotes healing, and activates the immune response through the oxidative process, playing a crucial role in the treatment of infectious changes or those resulting from hypovascularization (Xiao et al. 2017). These properties support the use of this adjuvant in the three reported cases of ORN, which demonstrated improvements in clinical appearance, either through a reduction in symptoms or inflammatory signs following its use.

PRF is a blood derivative composed of leukocytes and platelets that are responsible for its distinct biological properties (Harris et al. 2022). Because of its angiogenesis-stimulating potential and the presence of growth factors, this resource plays a role in cellular proliferation, differentiation, and activity, significantly contributing to tissue regeneration and consequently optimizing clinical outcomes (Baca-Gonzalez et al. 2022; Vorakulpipat et al. 2023). The A-PRF variant used in case 2 is characterized by the release of growth factors and ease of handling. Its strategic use in the post-extraction socket aims to accelerate the healing process (Harris et al. 2022).

Clinical progression and healing outcomes

Ozone therapy was effective in controlling infection and promoting progressive healing in all three reported cases. Case 2 exhibited rapid and more effective epithelialization with the combined use of ozone and A-PRF, suggesting a synergistic effect. Tissue stability, absence of recurrence, and reduction of inflammatory signs were maintained throughout the long-term follow-up period.

The difference in healing speed between Case 1 (ozone only) and Case 2 (ozone + A-PRF) may reflect this potential synergy; however, other factors, such as the patient's immune response or comorbidities, could have influenced the outcomes.

Hemimandibulectomy and flap reconstruction were required in Case 3, which presented with the most advanced stage of ORN. Adjunctive ozone therapy appeared to support postoperative wound stability and flap viability even in this invasive surgical context, suggesting its potential to enhance surgical healing.

Comparison with the literature and study limitations

Consistent with previous studies, the present findings support the use of ozone and PRF as effective agents for tissue repair and infection control in hypovascular environments (Suh et al. 2019; Vorakulpipat et al. 2023). However, in advanced cases such as stage III ORN, surgical intervention remains indispensable, as illustrated in Case 3 (Jin et al. 2020; Harris et al. 2022).

These cases suggest that the early implementation of adjunctive therapies may prevent disease progression and reduce the need for surgery. However, it remains unclear whether these therapeutic benefits stem from ozone, PRF, or their combination. Controlled studies are required to disentangle individual contributions.

Despite these promising results, this study had certain limitations, especially in the context of oncology. The small sample size precludes generalization, and the absence of a control group treated solely with conventional methods complicates the evaluation of the individual effects of ozone and PRF. Although clinically appropriate, the fact that each patient received individualized treatment based on their clinical presentation reduces the standardization and reproducibility of the results.

Further clinical trials with larger sample sizes and standardized protocols are warranted to validate the efficacy and reproducibility of these adjunctive therapeutic strategies. Their potential to enhance healing and reduce the need for invasive procedures increases their worthiness for continued investigation for ORN management.

5. Conclusions

This case reports shows that the adjunctive use of ozone therapy, either alone or in combination with PRF therapy, is associated with tissue regeneration, infection control, and long-term clinical stability in patients with varying stages of ORN. These results reinforce the clinical potential of incorporating conservative therapies into individualized treatment protocols. Further research is required to determine the effects of these therapies individually and to establish evidence-based guidelines.

Authors' Contributions: CASTRO, L.M.S.R.R: conception and design, data acquisition through clinical cases, manuscript drafting; NETO, A.P.S.: manuscript drafting, literature review, patient management; LIMA, L.B.: data interpretation, critical revision of the manuscript; PAULO, L.F.B.: data interpretation, manuscript editing and revision; SOARES, P.B.F: academic supervision, critical revision of intellectual content, alignment with journal guidelines. All authors: final approval of the version to be published.

Conflicts of Interest: The authors declare no conflicts of interest.

Ethics Approval: Approved by the Research Ethics Committee - CAAE: 64415522.0.0000.5152.

Acknowledgments: This study was supported by CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior) – Finance Code 001, CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico) - INCT Saúde Oral e Odontologia - Grants n. 406840/2022-9 and FAPEMIG (Fundação de Amparo à Pesquisa de Minas Gerais).

References

AKDENIZ, S. S. et al. The effects of ozone application on genotoxic damage and wound healing in bisphosphonate-applied human gingival fibro blast cells. *Clin Oral Investig*. 2018, **22** (2), 867-873. https://doi.org/10.1007/s00784-017-2163-6

BACA-GONZALEZ, L. et al. Plasma rich in growth factors (PRGF) and leukocyte-platelet rich fibrin (L-PRF): comparative release of growth factors and biological effect on osteoblasts. *Int J Implant Dent*. 2022, **8** (1), 39. https://doi.org/10.1186/s40729-022-00440-4

BEAUMONT, S. et al. Timing of dental extractions in patients undergoing radiotherapy and the incidence of osteoradionecrosis: a systematic re view and meta-analysis. *Br J Oral Maxillofac Surg*. 2021, **59** (5), 511-523. https://doi.org/10.1016/j.bjoms.2020.10.006

BORGES, G. A. et al. In vitro evaluation of wound healing and antimicrobial potential of ozone therapy. *J Craniomaxillofac Surg*. 2017, **45** (3), 36 4-370. https://doi.org/10.1016/j.jcms.2017.01.005

CECERSKA-HERYĆ, E. et al. Applications of the regenerative capacity of platelets in modern medicine. *Cytokine Growth Factor Rev.* 2022, **64**, 84 -94. https://doi.org/10.1016/j.cytogfr.2021.11.003

DA SILVA K. G. et al. O uso da ozonioterapia no âmbito odontológico: uma intervenção multifacetada. *Revista Contemporânea*. 2024, **4** (4), 01-16. https://doi.org/10.56085/RCV4N4-073

FRITZ M. A. et al. Managing Mandibular Osteoradionecrosis. *Otolaryngol Head Neck Surg*. 2025, **172** (2), 406-418. https://doi.org/10.1002/ohn .990

HARRIS, P. et al. Platelet-rich fibrin as a treatment option for osteoradionecrosis: A literature review. *J Stomatol Oral Maxillofac Surg*. 2022, **12 3** (3), 20-27. https://doi.org/10.1016/j.jormas.2021.06.005

HE, Y. et al. Retrospective analysis of osteoradionecrosis of the mandible: proposing a novel clinical classification and staging system. *Int J Oral Maxillofac Surg*. 2015, **44** (12), 1547-1557. https://doi.org/10.1016/j.ijom.2015.04.006

JIN, T. et al. Preoperative status and treatment of osteoradionecrosis of the jaw: a retrospective study of 252 cases. *Br J Oral Maxillofac Surg*. 2 020, **58** (10), 276-282. https://doi.org/10.1016/j.bjoms.2020.07.031

KERWAN, A. et al. Revised Surgical Case Report (SCARE) guideline: An update for the age of Artificial Intelligence. *Premier Journal of Science*. 2025, 10. https://doi.org/10.70389/PJS.100079

MANZANO, B. R. et al. Retrospective study of osteoradionecrosis in the jaws of patients with head and neck cancer. *J Korean Assoc Oral Maxillofac Surg*. 2019, **45** (1), 21-28. https://doi.org/10.5125/jkaoms.2019.45.1.21

ROMARY, D. J. et al. Liquid ozone therapies for the treatment of epithelial wounds: A systematic review and meta-analysis. *Int Wound J*. 2023, **20** (4), 1235-1252. https://doi.org/10.1111/iwj.13941

STORE, G., BOYSEN, M. Mandibular osteoradionecrosis: clinical behaviour and diagnostic aspects. *Clin Otolaryngol Allied Sci*. 2000, **25** (5), 378-384. https://doi.org/10.1046/j.1365-2273.2000.00367.x

SUH, Y. et al. Clinical utility of ozone therapy in dental and oral medicine. *Med Gas Res*. 2019, **9** (3), 163-167. https://doi.org/10.4103/2045-9912.266997

VENERI. F. et al. Ozone therapy in dentistry: An overview of the biological mechanisms involved (Review). *Biomed Rep*. 2024, **21** (2), 115. https://doi.org/10.3892/br.2024.1803

VORAKULPIPAT, P. et al. Combination of Advanced Platelet-Rich Fibrin and Pentoxifylline/Tocopherol as a Novel Preventive Option in Osteoradionecrosis: A Case Report. *Eur J Dent*. 2023, **17** (1), 250-254. https://doi.org/10.1055/s-0042-1750777

XIAO, W. et al. Ozone oil promotes wound healing by increasing the migration of fibroblasts via PI3K/Akt/mTOR signaling pathway. *Biosci Rep*. 2017, **37** (6), BSR20170658. https://doi.org/10.1042/BSR20170658

YILMAZ, B. et al. Challenges in the radiological diagnosis of osteoradionecrosis of the jaw in head and neck cancer patients. Em: C.M. SERGI, ed. *Advancements in cancer research*. Brisbane: Exon Publications. 2023. https://doi.org/10.36255/osteoradionecrosis-radiological-diagnosis.