

The Effect of Topical Oxygen Therapy Agents on Periodontal Healing and Inflammation.

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Background & Aim

Topical oxygen therapy is a preferred treatment modality for sites with chronic infection and inflammation, such as periodontitis (Fig. 1). Local oxygen delivery promotes wound healing by enhancing chemotaxis and angiogenesis and decreases infection and inflammation. This in vitro study evaluated the effect of different topical oxygen therapy (blue®m) formulations on periodontal tissue healing and inflammation.

Fig. 1. Periodontitis



Methods & Results

Fig. 2. blue®m products studied



Fig. 3. Human Gingival Fibroblasts

3a. In vitro cell viability



3b. In vitro cell proliferation

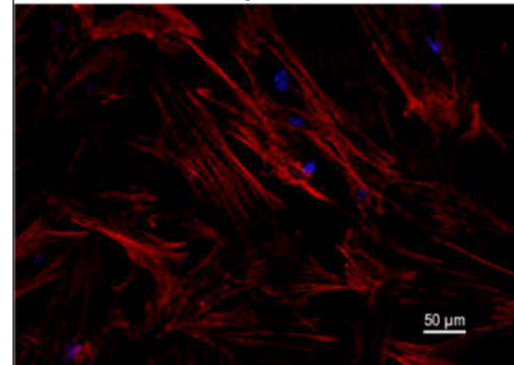


Fig. 4. Control



An in vitro study was conducted using cultured human gingival fibroblasts (HGnF) exposed to different formulations of blue®m oxygen delivery products at a concentration of 1.2% (Fig. 2), with chlorhexidine (0.2%) (Fig. 4) as a control. HGnF cells were evaluated for cell viability (Fig. 3a), cell proliferation (Fig. 3b), qualitative wound healing assay (Fig. 5), and expression of inflammatory markers (ROS –Reactive oxygen species, IL-1 β , IL-6, and TNF- α). While the study's results indicated significantly increased cell viability with all blue®m products (Fig. 6a), blue®m oral gel and oral foam showed significantly increased cell proliferation (Fig. 6b). All the tested oral care products showed similar wound healing characteristics, qualitatively, and promoted migration of HGnF cells into a simulated wound area. Interestingly, blue®m products resulted in a generalized significant decrease in the expression of all studied inflammatory markers, namely (ROS, IL-1 β , IL-6, and TNF- α) (Fig. 6c).

Fig. 5. Wound healing assay with different blue®m products

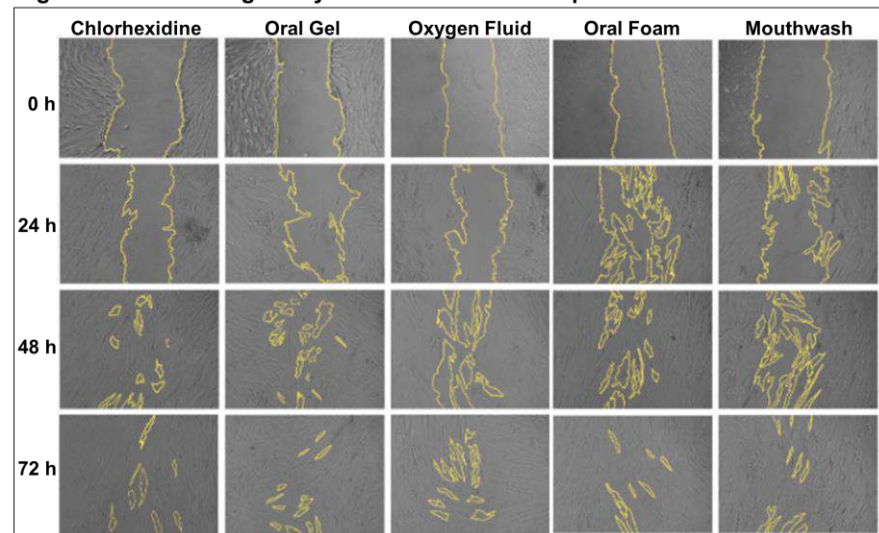
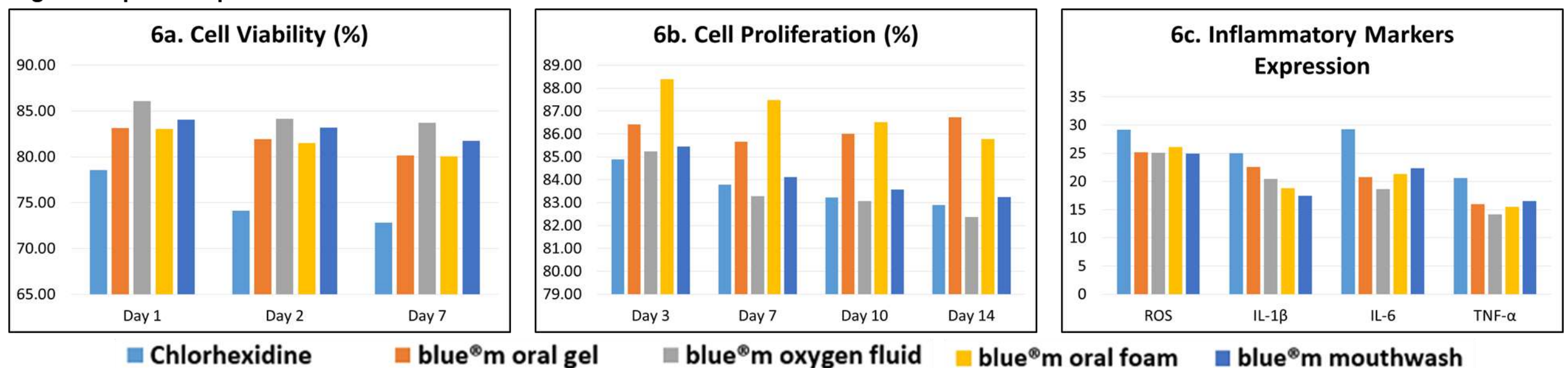


Fig. 6. Graphical representation of results



Conclusion

Local oxygen delivery using different blue®m oral care products to HGnF cells in an in vitro experiment significantly increased cell viability and proliferation, and decreased expression of inflammatory markers compared to chlorhexidine. Wound healing ability was comparable across all studied formulations. HGnF cells are mainly responsible for tissue healing and recovery after periodontal and oral surgical procedures. Therefore, this study results encourage the clinical use of blue®m oxygen therapy formulations to enhance periodontal tissue healing and reduce the risk of inflammation.

References





Background & Aim

This clinical case shows a 50 years old female patient, not smoker that came to our attention because of a vertical fracture of the tooth 14. The aim of the treatment is to substitute the compromised tooth 14 with a post extractive Neodent Zi Implant performing an immediate delivery of the restoration in association with the usage of the Bluem Oral Gel.

Case Report & Results

After the tridimensional analysis of the bone we perform an atraumatic extraction separating the two roots of the tooth 14 (Fig.1). The socket is accurately cleaned and rinsed with the Bluem Oral Fluid and during the same surgery it is placed a Neodent Zi Implant (Fig.2/3/4), an implant made for high aesthetic outcomes with a great peri-implant tissues reaction, achieving a high primary stability (45N) that allow us to take digital impressions and to delivery the immediate provisional screw retained restoration (Fig.5/6). The whole area of the surgery is covered with Bluem Oral Gel and the patient is instructed in its use during the healing.

After 15 weeks of healing time the tissue have achieved a great maturation (Fig.7) and we are ready to take final impressions using an intra-oral scanner. During the day of the delivery the Bluem Oral Gel is applied directly on the crown screw (Fig.8) before connecting the restoration to the implant (Fig.9), this is possibile thanks to the fact that the Bluem Oral Gel doesn't contain oil that it might interfere with the correct torque of the delivery.

In addition, more Bluem Oral Gel is placed on the restoration during the delivery in order to eliminate the bacteria from the very initial moment of the final restoration delivery (Fig.10). Comparing the base line radiographic control with the two years follow up is visible a good stability of the bone around the implant.



Fig. 1 - Atraumatic Extraction

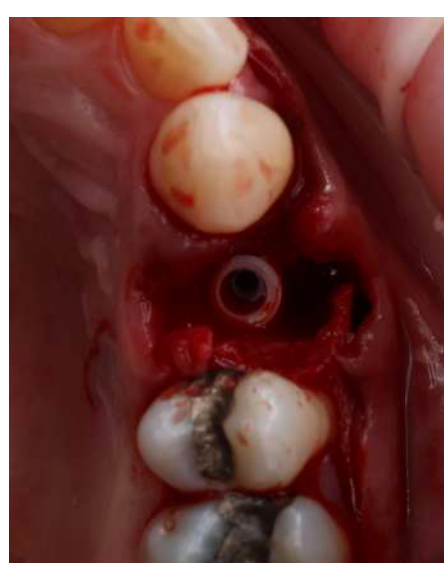


Fig. 2 - Implant Placement



Fig. 3 - Healing cap



Fig. 4 - Bluem usage



Fig. 5 - Provisional crown



Fig. 6 - Immediate loading



Fig. 7 - Tissue maturation



Fig. 8 - Final crown with Bluem



Fig. 9 - Final restoration



Fig. 10 - Bluem application



Fig. 11 - Radiographical Control



Fig. 12 - 2 Years follow up

Conclusion

The usage of Bluem can reduce the plaque and the bacterial contamination of the healing site, this allow the clinician to obtain better tissue healing and shorter healing time. The combination of a great implant such as the Neodent Zi with Bluem can ensure a long term, predictable and aesthetic result.

References

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- Effects of an oxygen-releasing mouthwash for peri-implant health management. A pilot randomized controlled clinical trial. Caroline Paixão Custódio Et Al. Revista De Odontologia Da Unesp 2024;53:e20240021.

EFFECTIVENESS OF ACTIVE OXYGEN GEL COMBINED WITH ANTIMICROBIAL PHOTODYNAMIC THERAPY IN PREVENTING MEDICATION-RELATED OSTEONECROSIS OF THE JAWS IN SENESCENT FEMALE RATS



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Background & Aim

The treatment of medication-related osteonecrosis of the jaws (MRONJ) is complex, can be ineffective, and may lead to sequelae. Therefore, strategies aimed at its prevention are ideal. Antimicrobial photodynamic therapy (aPDT) has proven effective in preventing MRONJ. In an effort to enhance its effectiveness, this study combined the local use of active oxygen (AO) gel (blue[®]m) with aPDT. The aim was to evaluate the effect of active oxygen (AO) gel (Blue[®]M) associated with antimicrobial photodynamic therapy (aPDT) on the alveolar repair process in senescent female rats treated with zoledronate and to analyze its effectiveness in preventing of medication-related osteonecrosis of the jaws (MRONJ).

Methods

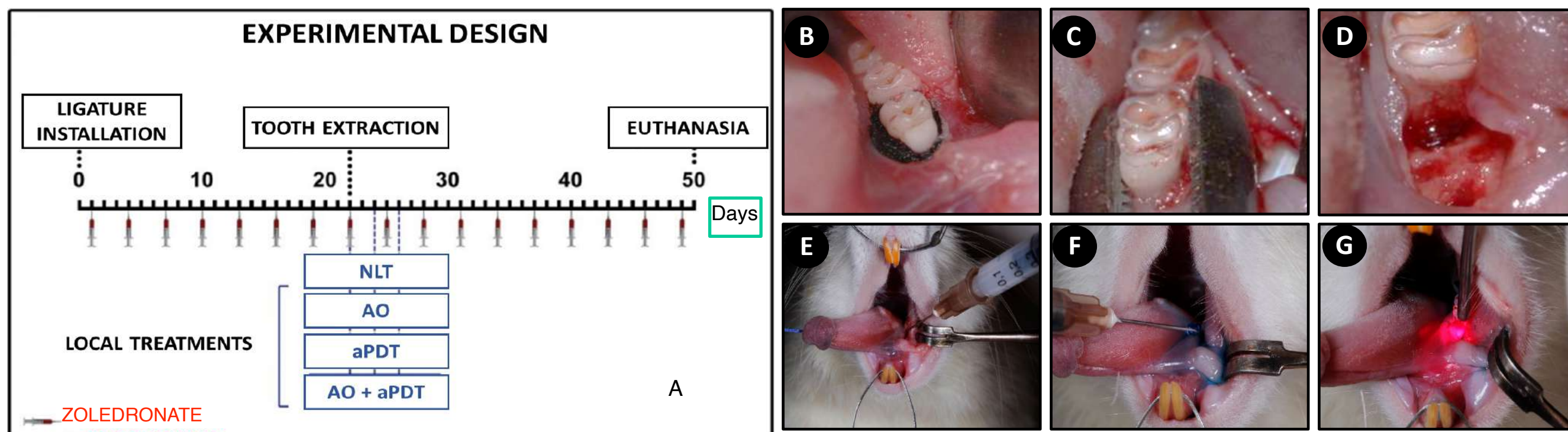


Fig. 1 – (A) Timeline showing the different experimental procedures performed at their respective times in the no local treatment (NLT), active oxygen (AO), antimicrobial photodynamic therapy (aPDT) and AO + aPDT groups. (B) Ligature in position on the first lower molar. (C) Luxation of the first lower molar. (D) Clinical aspect of the extraction site immediately after the exodontia. (E) Deposition of the active oxygen-releasing gel (blue[®]m) in the extraction site. (F) Deposition of the photoantimicrobial methylene blue in the extraction site. (G) Execution of aPDT in the extraction site with low-power laser irradiation.

Results

HISTOMETRIC ANALYSIS AND HISTOLOGICAL ANALYSIS

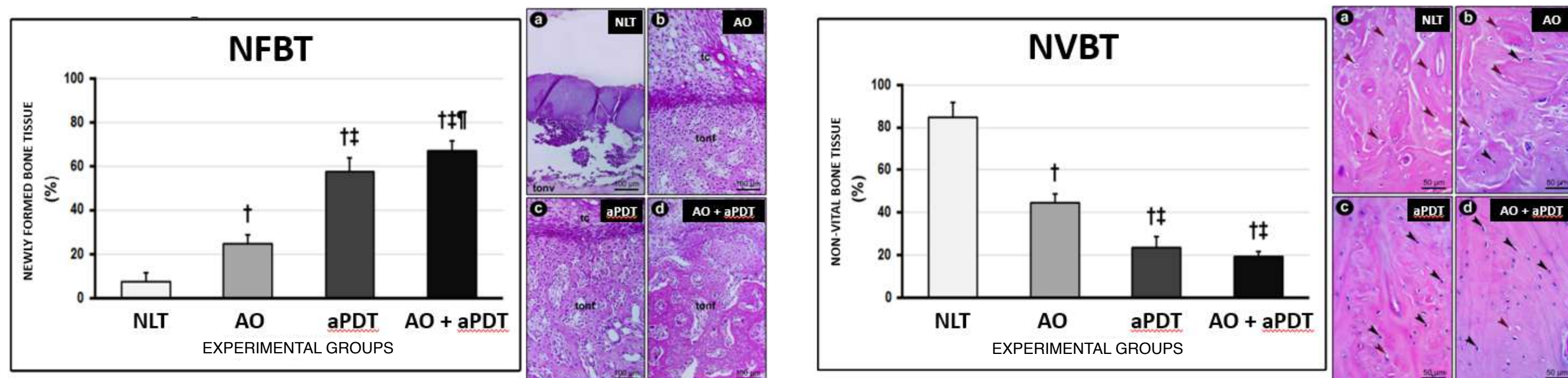


Fig 2 - Photomicrographs: (a - d) Photomicrographs showing the histological aspect of newly formed bone tissue (NFBT) and non-vital bone tissue (NVBT) in the dental extraction site 28 days post-operatively in NLT (a), AO (b), aPDT (c), and AO+aPDT (d). Abbreviations and symbols: **tc**, connective tissue; **tonf**, newly formed bone tissue; black arrows, lacunae containing osteocytes; red arrows, lacunae empty of osteocytes or containing osteocyte remnants. Staining: HE. Original magnification: 200x. Scale bars: 100 μ m. **Graphs:** Percentage of newly formed bone tissue (NFBT) and percentage of non-vital bone tissue (NVBT) in the dental extraction site and surrounding areas in the different experimental groups. Statistical analysis: Shapiro-Wilk test, Analysis of Variance (ANOVA), and Tukey's post hoc test. Symbols: †, statistically significant difference compared to the NTL group; ‡, statistically significant difference compared to the AO group; ¶, statistically significant difference compared to the aPDT group.

IMMUNOHISTOCHEMICAL ANALYSIS (BMP 2/4 AND OCN)

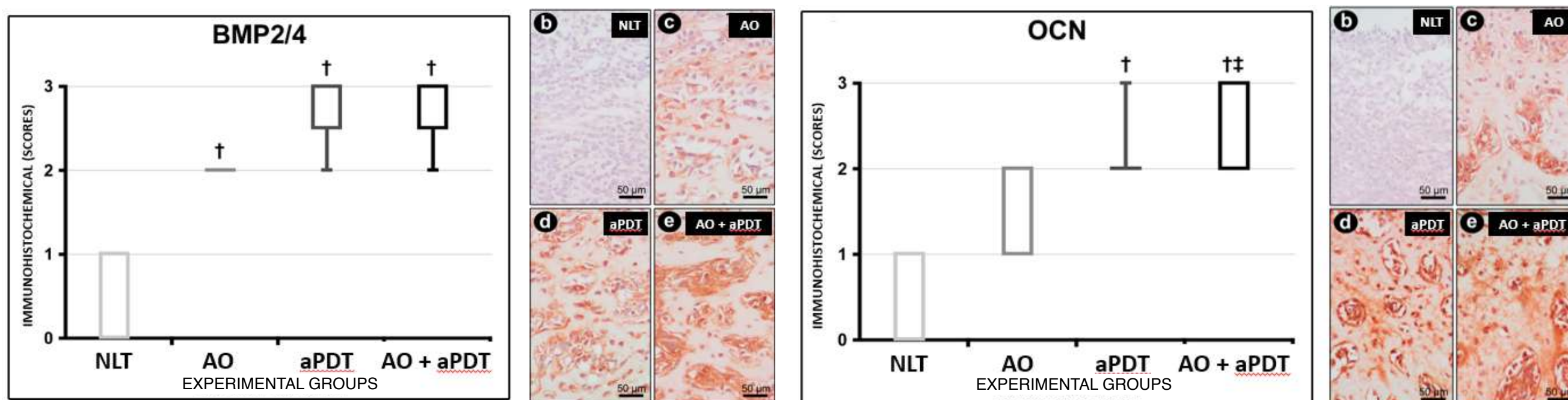


Fig. 3 - Photomicrographs: (b - e) Photomicrographs showing the histological aspect of immunostaining for BMP2/4 and OCN in the dental extraction site in NTL (b), AO (c), aPDT (d), and AO+aPDT (e). Counterstaining: Harris hematoxylin. Original magnification: 400x. Scale bars: 50 μ m. **Graph:** Graph showing the median and interquartile range of scores attributed to immunostaining for BMP2/4. Statistical test: Kruskal-Wallis Analysis of Variance and Student-Newman-Keuls post hoc test. Symbols: †, statistically significant difference compared to the NTL group. **Graph:** Graph showing the median and interquartile range of scores attributed to immunostaining for OCN. Statistical test: Kruskal-Wallis Analysis of Variance and Student-Newman-Keuls post hoc test. Symbols: †, statistically significant difference compared to the NTL group; ‡, statistically significant difference compared to the AO group.

Conclusion

The combination of AO (blue[®]m) gel and aPDT proved to be the most effective therapy in preventing MRONJ.

PHOTOBIOMODULATION WITH ACTIVE OXYGEN AND LACTOFERRIN IN THE TREATMENT OF MEDICATION-RELATED OSTEONECROSIS OF THE JAW. A CASE REPORT

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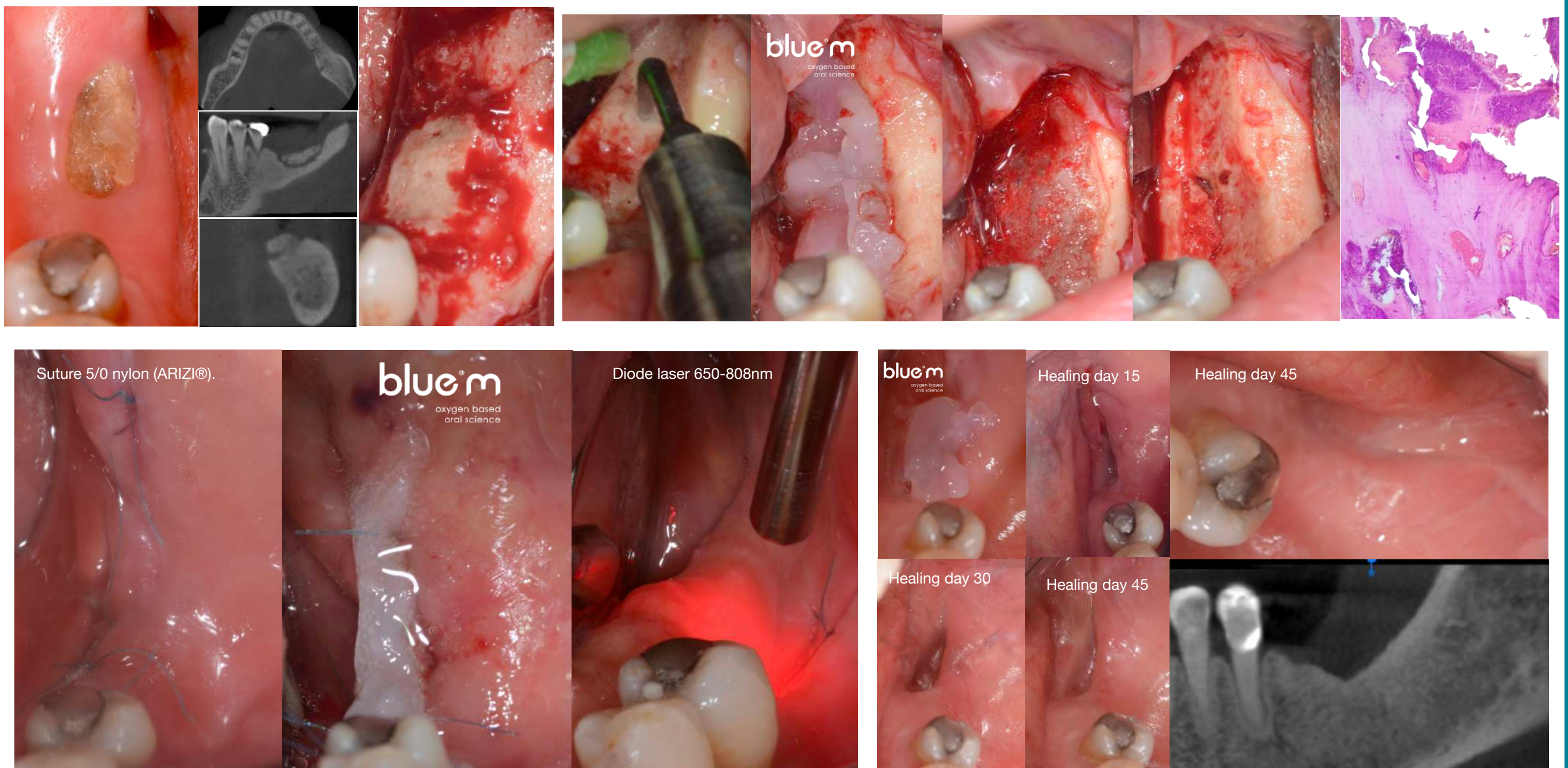
Background & Aim

Medication-related osteonecrosis of the jaw (MRONJ) affects approximately 5% of patients treated with bisphosphonates and other similar drugs. This report describes the management of a MRONJ case using photobiomodulation (PBM) therapy combined with active oxygen and lactoferrin (Blue[®]M).

Case Report& Results

The patient is a 62-year-old female with a medical history of hypertension, rheumatoid arthritis, and osteoporosis, treated with Bonames[®]. She presented with exposed bone in the alveolar ridge of the posterior quadrant following trauma.

Under informed consent, a minimally invasive surgical intervention using piezotome[®] was performed for histopathological analysis, revealing necrotic bone tissue with chronic infiltration. The treatment regimen included Blue[®]M teeth&bone formula once daily for 30 days, topical application of Blue[®]M gel every morning for 15 days, and photobiomodulation with an 808nm diode laser (Therapy-DMC[®]). Laser sessions were conducted daily until day 3, then twice weekly for four weeks. Additionally, the patient performed nightly oral rinses with Blue[®]M for 30 days. Initially, the patient reported a pain level of 3/10 on the visual analog scale, which decreased to 0/10 by the end of the treatment. Clinically, soft tissue healing was observed at 30 days, and a CT scan at 60 days showed hyperdense cancellous bone with a well-formed cortex and no abnormalities.



Conclusion

This case suggests that the combination of PBM with topical active oxygen and lactoferrin therapy, alongside a minimally invasive surgical intervention, is promising for the management of MRONJ.

