



## Research Article

Received September 1, 2026; Revised September 30, 2026; Accepted September 30, 2026, Published September 30, 2026

DOI: 10.6026/973206300225945

SJIF 2026 (Scientific Journal Impact Factor for 2026) = 8.478

2022 Impact Factor (2023 Clarivate Inc. release) is 1.9

### Declaration on Publication Ethics:

The author's state that they adhere with COPE guidelines on publishing ethics as described elsewhere at <https://publicationethics.org/>. The authors also undertake that they are not associated with any other third party (governmental or non-governmental agencies) linking with any form of unethical issues connecting to this publication. The authors also declare that they are not withholding any information that is misleading to the publisher in regard to this article.

### Declaration on official E-mail:

The corresponding author declares that lifetime official e-mail from their institution is not available for all authors

### License statement:

This is an Open Access article which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited. This is distributed under the terms of the Creative Commons Attribution License

### Comments from readers:

Articles published in BIOINFORMATION are open for relevant post publication comments and criticisms, which will be published immediately linking to the original article without open access charges. Comments should be concise, coherent and critical in less than 1000 words.

### Disclaimer:

Bioinformation provides a platform for scholarly communication of data and information to create knowledge in the Biological/Biomedical domain after adequate peer/editorial reviews and editing entertaining revisions where required. The views and opinions expressed are those of the author(s) and do not reflect the views or opinions of Bioinformation and (or) its publisher Biomedical Informatics. Biomedical Informatics remains neutral and allows authors to specify their address and affiliation details including territory where required.

Edited by Ritik Kashwani

E-mail: [docritikkashwani@yahoo.com](mailto:docritikkashwani@yahoo.com)

Citation: Garg *et al.* Bioinformation 22(9): 5945-5949 (2026)

# Platelet-rich fibrin, BlueM gel and ozonated olive oil following gingivectomy: A randomized controlled clinical trial

Ankita Garg<sup>1,\*</sup>, Satendra Sharma<sup>2</sup>, Preksha Agrawal<sup>3</sup> & Mohan Rawat<sup>2</sup>

<sup>1</sup>Department of Dentistry, Government Medical College, Datia, Madhya Pradesh, India; <sup>2</sup>Department of Periodontics, KD Dental College and Hospital, Mathura, Uttar Pradesh, India; <sup>3</sup>Department of Obstetrics and Gynecology, Shri Ramkrishna Institute Of Medical Sciences and Sanaka Hospitals, Durgapur, West Bengal, India; \*Corresponding author

### Affiliation URL:

<https://datiamedicalcollege.edu.in/>

<https://kddental.in/>

<https://srim.ssetgoi.ac.in/>

**Author contact:**

Ankita Garg - E-mail: anky14.ag@gmail.com

Satendra Sharma - E-mail: dr.satendrasharma88@gmail.com

Preksha Agrawal - E-mail: agrawalpreksha40@gmail.com

Mohan Rawat - E-mail: mohanrawat011@gmail.com

**Abstract:**

Post-surgical wound healing after gingivectomy and gingivoplasty is essential for reducing pain and promoting rapid tissue repair. Therefore, it is of interest to compare the PRF, ozonated olive oil, BlueM gel and Coe-pak in 40 surgical sites with chronic inflammatory gingival enlargement. Clinical parameters, post-operative pain, Landry Healing Index and epithelialization were assessed from baseline through 30 days. PRF and ozonated olive oil accelerated healing, reduced pain and enhanced re-epithelialization compared with Coe-pak alone. BlueM gel provided superior early epithelial coverage, while PRF and ozonated olive oil emerged as promising adjuncts for post-operative periodontal wound management.

**Keywords:** Gingivectomy, gingivoplasty, platelet-rich fibrin, bluem gel, ozonated olive oil, wound healing, landry healing index

**Background:**

Gingival enlargement is a common clinical condition characterized by an increase in gingival size due to factors such as plaque-induced inflammation, medications, hormonal changes, systemic diseases and idiopathic causes. Drug-induced gingival overgrowth associated with anticonvulsants, immunosuppressants and calcium-channel blockers can impair esthetics, mastication, speech and oral hygiene [1]. While inflammatory enlargement often resolves with non-surgical periodontal therapy, fibrotic enlargement usually requires gingivectomy and gingivoplasty to eliminate excess tissue and restore normal gingival contours [2]. Following these procedures, wounds heal by secondary intention and are commonly protected with periodontal dressings such as Coe-pak. However, post-operative pain, delayed re-epithelialization and prolonged healing remain important clinical concerns [3]. To improve post-operative healing, several biologically active adjuncts have been investigated. Platelet-rich fibrin (PRF), a second-generation autologous platelet concentrate introduced by Choukroun, contains a fibrin matrix enriched with platelets, leukocytes and growth factors that promote angiogenesis, fibroblast proliferation, collagen synthesis and tissue regeneration. Clinical studies have demonstrated that PRF accelerates soft-tissue healing, enhances re-epithelialization and reduces post-operative pain following periodontal surgical procedures [4]. BlueM gel is an oxygen-releasing topical agent containing sodium perborate, glucose oxidase, xylitol and lactoferrin. By continuously releasing active oxygen, it suppresses anaerobic microorganisms, enhances cellular metabolism, stimulates angiogenesis and promotes collagen formation and epithelial repair. Randomized clinical studies have reported improved wound healing and reduced post-operative discomfort with BlueM gel compared with conventional periodontal dressing after periodontal plastic procedures [5]. Ozonated olive oil combines the antimicrobial and anti-inflammatory effects of ozone with the stability of olive oil, providing prolonged topical activity. It promotes angiogenesis, enhances tissue repair and reduces microbial contamination [6]. Clinical evidence supports its effectiveness in periodontal wound healing, palatal donor sites, depigmented

gingiva and extraction sockets, with favorable effects on pain reduction and tissue regeneration [7]. Although PRF, BlueM gel and ozonated olive oil have each shown promising clinical outcomes, direct comparisons among these adjuncts following gingivectomy and gingivoplasty remain limited [8]. Therefore it is of interest to evaluate the efficacy of PRF, BlueM gel and Ozonated olive oil with Coe-pak alone on wound healing, post-operative pain, re-epithelialization and clinical periodontal parameters following gingivectomy and gingivoplasty in patients with chronic inflammatory gingival enlargement.

**Methodology:**

This study was designed as a single-blinded, randomized controlled, split-mouth *in vivo* clinical trial conducted in the Department of Periodontology after obtaining institutional ethical clearance and written informed consent from all participants. Forty surgical sites with chronic inflammatory gingival enlargement were selected in systemically healthy individuals aged 20–50 years presenting with bilateral upper and lower anterior gingival overgrowth without radiographic bone loss or attachment loss. Patients with systemic diseases (diabetes, bleeding disorders), pregnant or lactating females, smokers and tobacco chewers and those who had received periodontal therapy within the preceding six months were excluded. The 40 sites were randomly assigned by simple random sampling into four equal groups (n = 10 each) (Group A) – Ozonated olive oil application followed by Coe-pak; (Group B) – Platelet-rich fibrin (PRF) application followed by Coe-pak; (Group C) – BlueM gel application followed by Coe-pak; (Group D) (control) – Coe-pak periodontal dressing alone. On the first visit, full-mouth periodontal evaluation was performed, including measurement of Plaque Index (Silness & Loe, 1964), Gingival Index (Loe & Silness, 1963), Probing Pocket Depth (PPD) using a UNC-15 probe at six sites per tooth and Bleeding on Probing (BOP). Orthopantomograms (OPG) were obtained for all participants and Phase-I therapy comprising full-mouth scaling and curettage with oral-hygiene reinforcement was completed. After one week (designated as “after IPT”), all baseline clinical parameters were re-recorded and the surgical procedure was performed. After a preprocedural chlorhexidine

rinse, gingivectomy and gingivoplasty were performed using a No. 15 BP blade, Kirkland and Orbans knives in the assigned surgical sites. PRF was prepared by drawing 10 mL of the patient's venous blood into a glass tube and centrifuging at 3000 rpm for 10 minutes; the resulting fibrin clot was separated and applied as a membrane. Ozonated olive oil and BlueM gel were applied topically over their assigned surgical sites according to the manufacturers' instructions and all four groups were covered with Coe-pak periodontal dressing. Routine post-operative analgesics, antibiotics and oral-hygiene instructions were prescribed. Post-operative clinical assessments were carried out at three time-points: T1 – 8th day (removal of Coe-pak); T2 – 15th day; and T3 – 30th day. Pain was recorded using a 0–10 Visual Analog Scale (VAS); soft-tissue healing was graded with the Landry Healing Index (LTH, 1–5 scale); and epithelialization was evaluated using the 3% H<sub>2</sub>O<sub>2</sub> foaming test, where complete re-epithelialization was indicated by the absence of foaming. PI, GI, PPD and BOP were re-recorded at the 30th day. All clinical readings were taken by a single blinded examiner. Statistical analysis was performed using SPSS version 24; intragroup comparisons used the paired t-test and intergroup comparisons used the independent t-test and chi-square test, with a P-value ≤ 0.05 considered statistically significant.

### Results:

All 40 surgical sites completed the study follow-up, with no participant loss or adverse healing events. VAS, LTH, H<sub>2</sub>O<sub>2</sub> foaming test, PI, GI, PPD and BOP were evaluated using paired and unpaired t-tests, with statistical significance set at P ≤ 0.05. All four groups demonstrated a statistically highly significant reduction in post-operative pain from day 8 to day 30. In Group B (PRF), mean VAS decreased from 3.30 ± 0.67 on day 8 to 1.40 ± 0.52 on day 15 and 0.00 ± 0.00 on day 30 (P = 0.002 and 0.004, respectively). Similar significant reductions were observed in Group C (BlueM), Group A (ozonated olive oil) and Group D (Coe-pak) (**Table 1**). Intergroup comparison showed no statistically significant differences in VAS among the four groups on days 8, 15, or 30 (P = 0.181, 0.897 and 1.000, respectively). BlueM recorded the lowest mean VAS on day 8 (2.60 ± 0.70), although this difference was not statistically significant (**Table 2**). LTH scores increased significantly within all four groups between days 8 and 30. PRF improved from 3.70 ± 0.67 to 5.00 ± 0.00, BlueM from 4.00 ± 0.82 to 5.00 ± 0.00, ozonated olive oil from 3.80 ± 0.63 to 5.00 ± 0.00 and Coe-pak from 3.60 ± 0.52 to 5.00 ± 0.00. All groups achieved the maximum

LTH score of 5 by day 30 (**Table 3**). Despite differences in mean LTH values during the early healing period, intergroup comparisons were not statistically significant on days 8, 15, or 30 (P = 0.656, 0.958 and 1.000, respectively). BlueM showed the highest mean LTH values at days 8 and 15 (**Table 4**). The H<sub>2</sub>O<sub>2</sub> foaming test demonstrated a statistically significant intergroup difference during the early healing period. On day 8, complete epithelialization was observed in 4/10 sites (40%) in the BlueM group, compared with 0/10 sites in the PRF, ozonated olive oil and Coe-pak groups (P = 0.004). By day 15, complete epithelialization increased to 10/10 sites (100%) in the BlueM group and 5/10 sites (50%) in each of the remaining groups (P = 0.046). By day 30, all groups achieved 100% epithelialization (P = 1.000) (**Table 5**). PI scores decreased significantly from baseline to day 30 in all four groups. The reductions were statistically highly significant in the PRF, BlueM, ozonated olive oil and Coe-pak groups (P ≤ 0.005 for baseline-to-day-30 comparisons), indicating improved plaque control following periodontal therapy and standardized oral-hygiene reinforcement (**Table 6**). GI scores also demonstrated statistically significant reductions from baseline to day 30 in all four groups (P < 0.01). However, the intergroup differences were not statistically significant, indicating comparable resolution of gingival inflammation across the treatment groups (**Table 7**). PPD decreased significantly within all groups from baseline to day 30. The PRF group decreased from 3.40 ± 1.07 mm to 2.30 ± 0.48 mm, BlueM from 3.30 ± 1.06 mm to 2.40 ± 0.52 mm, ozonated olive oil from 4.00 ± 1.05 mm to 2.50 ± 0.53 mm and Coe-pak from 4.10 ± 0.88 mm to 2.60 ± 0.52 mm (**Table 8**). Intergroup comparison showed no significant difference at baseline (P = 0.219) or day 30 (P = 1.000); however, a significant difference was observed after initial periodontal therapy (P = 0.003), with PRF demonstrating the greatest early reduction in PPD. BOP scores decreased significantly from baseline to day 30 in all four groups (P = 0.004). Nevertheless, intergroup comparisons showed no statistically significant differences at baseline, after initial periodontal therapy, or at day 30 (P = 0.806, 0.745 and 1.000, respectively) (**Table 9**). At day 30, there were no statistically significant intergroup differences in VAS, LTH, H<sub>2</sub>O<sub>2</sub> epithelialization, PI, GI, PPD, or BOP; all corresponding P-values were 1.000. All groups showed complete epithelialization, absence of post-operative pain, zero PI and GI scores, mean PPD values ranging from 2.30 to 2.60 mm and zero BOP scores (**Table 10**).

**Table 1:** Intragroup comparison of Visual Analog Scale (VAS) scores within each group across time points (paired t-test)

| Group                        | 8th day Mean ± SD | 15th day Mean ± SD | 30th day Mean ± SD | 8th vs 15th day P-value | 8th vs 30th day P-value |
|------------------------------|-------------------|--------------------|--------------------|-------------------------|-------------------------|
| Group B (PRF)                | 3.30 ± 0.67       | 1.40 ± 0.52        | 0.00 ± 0.00        | 0.002 HS                | 0.004 HS                |
| Group C (BlueM Gel)          | 2.60 ± 0.70       | 1.50 ± 0.53        | 0.00 ± 0.00        | 0.002 HS                | 0.004 HS                |
| Group A (Ozonated Olive Oil) | 3.20 ± 0.79       | 1.60 ± 0.70        | 0.00 ± 0.00        | 0.004 HS                | 0.004 HS                |
| Group D (Coe-pak)            | 2.90 ± 0.88       | 1.40 ± 0.52        | 0.00 ± 0.00        | 0.004 HS                | 0.005 HS                |

HS = Highly Significant (P < 0.01). All four groups showed a statistically highly significant reduction in post-operative pain from the 8th to the 30th day.

**Table 2:** Intergroup comparison of Visual Analog Scale (VAS) scores among the four groups at each post-operative time point (one-way comparison)

| Time point | Group B (PRF) Mean ± SD | Group C (BlueM) Mean ± SD | Group A (Ozonated) Mean ± SD | Group D (Coe-pak) Mean ± SD |
|------------|-------------------------|---------------------------|------------------------------|-----------------------------|
| 8th day    | 3.30 ± 0.67             | 2.60 ± 0.70               | 3.20 ± 0.79                  | 2.90 ± 0.88                 |
| 15th day   | 1.40 ± 0.52             | 1.50 ± 0.53               | 1.60 ± 0.70                  | 1.40 ± 0.52                 |
| 30th day   | 0.00 ± 0.00             | 0.00 ± 0.00               | 0.00 ± 0.00                  | 0.00 ± 0.00                 |
| P-value    | 0.181 NS                | 0.897 NS                  | 1.000 NS                     | –                           |

NS = Non-significant ( $P > 0.05$ ). The intergroup VAS comparison demonstrated no statistically significant difference among the four groups at any time point, though BlueM gel (Group C) recorded the lowest mean VAS score at day 8.

**Table 3:** Intragroup comparison of Landry Healing Index (LTH) within each group across time points (paired t-test)

| Group                        | 8th day Mean $\pm$ SD | 15th day Mean $\pm$ SD | 30th day Mean $\pm$ SD | 8th vs 15th day P-value | 8th vs 30th day P-value |
|------------------------------|-----------------------|------------------------|------------------------|-------------------------|-------------------------|
| Group B (PRF)                | 3.70 $\pm$ 0.67       | 4.60 $\pm$ 0.52        | 5.00 $\pm$ 0.00        | 0.003 HS                | 0.006 HS                |
| Group C (BlueM Gel)          | 4.00 $\pm$ 0.82       | 4.70 $\pm$ 0.48        | 5.00 $\pm$ 0.00        | 0.008 HS                | 0.015 S                 |
| Group A (Ozonated Olive Oil) | 3.80 $\pm$ 0.63       | 4.60 $\pm$ 0.52        | 5.00 $\pm$ 0.00        | 0.005 HS                | 0.006 HS                |
| Group D (Coe-pak)            | 3.60 $\pm$ 0.52       | 4.60 $\pm$ 0.52        | 5.00 $\pm$ 0.00        | 0.002 HS                | 0.004 HS                |

S = Significant ( $P < 0.05$ ); HS = Highly Significant ( $P < 0.01$ ). All four groups attained the maximum LTH score (excellent healing = 5) by the 30th day; BlueM gel and Ozonated olive oil groups recorded the highest mean LTH at day 8.

**Table 4:** Intergroup comparison of Landry Healing Index (LTH) among the four groups at each post-operative time point

| Time point | Group B (PRF) Mean $\pm$ SD | Group C (BlueM) Mean $\pm$ SD | Group A (Ozonated) Mean $\pm$ SD | Group D (Coe-pak) Mean $\pm$ SD |
|------------|-----------------------------|-------------------------------|----------------------------------|---------------------------------|
| 8th day    | 3.70 $\pm$ 0.67             | 4.00 $\pm$ 0.82               | 3.80 $\pm$ 0.63                  | 3.60 $\pm$ 0.52                 |
| 15th day   | 4.60 $\pm$ 0.52             | 4.70 $\pm$ 0.48               | 4.60 $\pm$ 0.52                  | 4.60 $\pm$ 0.52                 |
| 30th day   | 5.00 $\pm$ 0.00             | 5.00 $\pm$ 0.00               | 5.00 $\pm$ 0.00                  | 5.00 $\pm$ 0.00                 |
| P-value    | 0.656 NS                    | 0.958 NS                      | 1.000 NS                         | —                               |

Intergroup comparison of LTH revealed no statistically significant differences at any of the three time points; however, the BlueM gel group consistently demonstrated marginally higher mean LTH values at days 8 and 15.

**Table 5:** Intergroup comparison of H<sub>2</sub>O<sub>2</sub> foaming test (epithelialization) among the four groups: number of completely epithelialized sites (no foaming) versus non-epithelialized sites

| Time point | Group B (PRF) No foam / Foam (%) | Group C (BlueM) No foam / Foam (%) | Group A (Ozonated) No foam / Foam (%) | Group D (Coe-pak) No foam / Foam (%) |
|------------|----------------------------------|------------------------------------|---------------------------------------|--------------------------------------|
| 8th day    | 0 / 10 (0% / 100%)               | 4 / 6 (40% / 60%)                  | 0 / 10 (0% / 100%)                    | 0 / 10 (0% / 100%)                   |
| 15th day   | 5 / 5 (50% / 50%)                | 10 / 0 (100% / 0%)                 | 5 / 5 (50% / 50%)                     | 5 / 5 (50% / 50%)                    |
| 30th day   | 10 / 0 (100% / 0%)               | 10 / 0 (100% / 0%)                 | 10 / 0 (100% / 0%)                    | 10 / 0 (100% / 0%)                   |
| P-value    | 0.004 HS                         | 0.046 S                            | 1.000 NS                              | —                                    |

The H<sub>2</sub>O<sub>2</sub> foaming test revealed a statistically highly significant intergroup difference at day 8 ( $P = 0.004$ ) and a significant difference at day 15 ( $P = 0.046$ ), with the BlueM gel group demonstrating the most accelerated epithelialization. By the 30th day, complete epithelialization was achieved in all four groups.

**Table 6:** Intragroup comparison of Plaque Index (PI) within each group at baseline, after IPT and at 30 days (paired t-test)

| Group                        | Baseline Mean $\pm$ SD | After IPT Mean $\pm$ SD | 30 days Mean $\pm$ SD | Baseline vs IPT P-value | Baseline vs 30 days P-value |
|------------------------------|------------------------|-------------------------|-----------------------|-------------------------|-----------------------------|
| Group B (PRF)                | 1.30 $\pm$ 0.48        | 0.40 $\pm$ 0.52         | 0.00 $\pm$ 0.00       | 0.003 HS                | 0.004 HS                    |
| Group C (BlueM Gel)          | 1.60 $\pm$ 0.70        | 0.80 $\pm$ 0.63         | 0.00 $\pm$ 0.00       | 0.005 HS                | 0.004 HS                    |
| Group A (Ozonated Olive Oil) | 1.30 $\pm$ 0.48        | 0.30 $\pm$ 0.48         | 0.00 $\pm$ 0.00       | 0.002 HS                | 0.004 HS                    |
| Group D (Coe-pak)            | 1.50 $\pm$ 0.53        | 0.50 $\pm$ 0.53         | 0.00 $\pm$ 0.00       | 0.002 HS                | 0.004 HS                    |

All four groups demonstrated a statistically highly significant intragroup reduction in plaque scores from baseline to the 30th post-operative day, attributable to the standardized oral-hygiene reinforcement protocol applied to all participants.

**Table 7:** Intergroup comparison of Gingival Index (GI) within each group at baseline, after IPT and at 30 days (paired t-test)

| Group                        | Baseline Mean $\pm$ SD | After IPT Mean $\pm$ SD | 30 days Mean $\pm$ SD | Baseline vs IPT P-value | Baseline vs 30 days P-value |
|------------------------------|------------------------|-------------------------|-----------------------|-------------------------|-----------------------------|
| Group B (PRF)                | 1.30 $\pm$ 0.48        | 0.30 $\pm$ 0.48         | 0.00 $\pm$ 0.00       | 0.002 HS                | 0.004 HS                    |
| Group C (BlueM Gel)          | 1.60 $\pm$ 0.70        | 0.50 $\pm$ 0.53         | 0.00 $\pm$ 0.00       | 0.002 HS                | 0.004 HS                    |
| Group A (Ozonated Olive Oil) | 1.50 $\pm$ 0.53        | 0.50 $\pm$ 0.53         | 0.00 $\pm$ 0.00       | 0.002 HS                | 0.004 HS                    |
| Group D (Coe-pak)            | 1.90 $\pm$ 0.74        | 0.90 $\pm$ 0.74         | 0.00 $\pm$ 0.00       | 0.002 HS                | 0.004 HS                    |

Mean Gingival Index scores reduced significantly from baseline to the 30th day in all four groups ( $P < 0.01$ ). On intergroup comparison the differences were non-significant, reflecting comparable resolution of gingival inflammation in all groups.

**Table 8:** Intragroup comparison of Probing Pocket Depth (PPD, mm) within each group at baseline, after IPT and at 30 days (paired t-test)

| Group                        | Baseline Mean $\pm$ SD | After IPT Mean $\pm$ SD | 30 days Mean $\pm$ SD | Baseline vs IPT P-value | Baseline vs 30 days P-value |
|------------------------------|------------------------|-------------------------|-----------------------|-------------------------|-----------------------------|
| Group B (PRF)                | 3.40 $\pm$ 1.07        | 2.40 $\pm$ 0.52         | 2.30 $\pm$ 0.48       | 0.008 HS                | 0.008 HS                    |
| Group C (BlueM Gel)          | 3.30 $\pm$ 1.06        | 2.70 $\pm$ 0.67         | 2.40 $\pm$ 0.52       | 0.014 S                 | 0.024 S                     |
| Group A (Ozonated Olive Oil) | 4.00 $\pm$ 1.05        | 3.40 $\pm$ 0.84         | 2.50 $\pm$ 0.53       | 0.014 S                 | 0.007 HS                    |
| Group D (Coe-pak)            | 4.10 $\pm$ 0.88        | 3.50 $\pm$ 0.53         | 2.60 $\pm$ 0.52       | 0.014 S                 | 0.006 HS                    |

On intergroup comparison of mean PPD, the four groups were comparable at baseline ( $P = 0.219$ ) and at 30 days ( $P = 1.000$ ); however, a statistically significant intergroup difference was observed after IPT ( $P = 0.003$ ), with PRF (Group B) achieving the greatest early reduction in pocket depth.

**Table 9:** Intragroup comparison of Bleeding on Probing (BOP) within each group at baseline, after IPT and at 30 days (paired t-test)

| Group                        | Baseline Mean $\pm$ SD | After IPT Mean $\pm$ SD | 30 days Mean $\pm$ SD | Baseline vs IPT P-value | Baseline vs 30 days P-value |
|------------------------------|------------------------|-------------------------|-----------------------|-------------------------|-----------------------------|
| Group B (PRF)                | 1.90 $\pm$ 0.74        | 0.80 $\pm$ 0.63         | 0.00 $\pm$ 0.00       | 0.002 HS                | 0.004 HS                    |
| Group C (BlueM Gel)          | 1.70 $\pm$ 0.67        | 0.70 $\pm$ 0.67         | 0.00 $\pm$ 0.00       | 0.002 HS                | 0.004 HS                    |
| Group A (Ozonated Olive Oil) | 1.60 $\pm$ 0.70        | 0.50 $\pm$ 0.53         | 0.00 $\pm$ 0.00       | 0.002 HS                | 0.004 HS                    |
| Group D (Coe-pak)            | 1.80 $\pm$ 0.79        | 0.80 $\pm$ 0.79         | 0.00 $\pm$ 0.00       | 0.002 HS                | 0.004 HS                    |

BOP showed a statistically highly significant intragroup reduction in all four groups from baseline to the 30th day ( $P = 0.004$ ). Intergroup comparison demonstrated no statistically significant differences at any time point (baseline  $P = 0.806$ ; after IPT  $P = 0.745$ ; 30 days  $P = 1.000$ ).

**Table 10:** Summary of intergroup comparisons across primary clinical outcomes at the 30th post-operative day

| Parameter                                | Group B (PRF)   | Group C (BlueM Gel) | Group A (Ozonated Olive Oil) | Group D (Coe-pak) | P-value  |
|------------------------------------------|-----------------|---------------------|------------------------------|-------------------|----------|
| VAS (30th day)                           | 0.00 $\pm$ 0.00 | 0.00 $\pm$ 0.00     | 0.00 $\pm$ 0.00              | 0.00 $\pm$ 0.00   | 1.000 NS |
| LTH (30th day)                           | 5.00 $\pm$ 0.00 | 5.00 $\pm$ 0.00     | 5.00 $\pm$ 0.00              | 5.00 $\pm$ 0.00   | 1.000 NS |
| H <sub>2</sub> O <sub>2</sub> (30th day) | 100% no foam    | 100% no foam        | 100% no foam                 | 100% no foam      | 1.000 NS |
| PI (30th day)                            | 0.00 $\pm$ 0.00 | 0.00 $\pm$ 0.00     | 0.00 $\pm$ 0.00              | 0.00 $\pm$ 0.00   | 1.000 NS |
| GI (30th day)                            | 0.00 $\pm$ 0.00 | 0.00 $\pm$ 0.00     | 0.00 $\pm$ 0.00              | 0.00 $\pm$ 0.00   | 1.000 NS |
| PPD (30th day, mm)                       | 2.30 $\pm$ 0.48 | 2.40 $\pm$ 0.52     | 2.50 $\pm$ 0.53              | 2.60 $\pm$ 0.52   | 1.000 NS |
| BOP (30th day)                           | 0.00 $\pm$ 0.00 | 0.00 $\pm$ 0.00     | 0.00 $\pm$ 0.00              | 0.00 $\pm$ 0.00   | 1.000 NS |

**Discussion:**

Scalpel gingivectomy and gingivoplasty remain the standard treatment for fibrotic gingival enlargement but result in open wounds that heal by secondary intention, often causing post-operative pain and delayed epithelialization. This split-mouth randomized controlled trial compared platelet-rich fibrin (PRF), BlueM gel, ozonated olive oil and Coe-pak dressing for enhancing post-operative healing. All groups showed significant improvements in pain, wound healing, plaque index, gingival index, probing pocket depth and bleeding on probing by day 30, indicating that satisfactory healing occurred irrespective of the adjunct used. The PRF group showed marked reductions in post-operative pain and improved wound healing, consistent with the regenerative effects of platelet-derived growth factors that promote angiogenesis, fibroblast proliferation and collagen synthesis. These findings agree with Ibrahim *et al.* [9], who reported enhanced VEGF and FGF-10 expression with injectable PRF after gingivectomy. BlueM gel showed the fastest early re-epithelialization, with significantly superior H<sub>2</sub>O<sub>2</sub> test scores during the first two post-operative weeks. Its controlled release of active oxygen likely enhances cellular metabolism, angiogenesis and epithelial repair while suppressing anaerobic microorganisms [10]. These results are consistent with Juliana and Tarek [11], who reported faster epithelialization and reduced pain after gingival depigmentation and with Alayadi *et al.* [10], who found improved periodontal healing following BlueM application. Similar benefits of oxygen-releasing biomaterials have also been reported in recent clinical studies [12, 13]. Ozonated olive oil produced clinical outcomes comparable to PRF, particularly in reducing post-operative pain and promoting wound healing. Its antimicrobial, antioxidant and angiogenic properties may explain these findings. Similar improvements have been reported by Tualzik *et al.* [14] and Bozkurt and Uslu [15] which collectively support the effectiveness of ozonated olive oil and PRF in enhancing periodontal wound healing, accelerating soft-tissue regeneration and reducing post-operative discomfort. Although no significant intergroup differences were observed for most clinical parameters by day 30, clinically relevant differences were evident during the early healing phase. BlueM gel promoted the most rapid epithelialization, whereas PRF and ozonated olive oil provided greater post-operative comfort and favorable periodontal healing. The split-mouth design and standardized clinical assessments strengthen the validity of these findings,

although the relatively small sample size and short follow-up limit long-term interpretation. Larger randomized trials with extended follow-up and biomarker analysis are required to confirm these observations.

**Conclusion:**

Platelet-rich fibrin, BlueM gel and ozonated olive oil improved early healing after gingivectomy and gingivoplasty. BlueM gel showed the fastest re-epithelialization, while platelet-rich fibrin and ozonated olive oil reduced post-operative pain and probing depth. These adjuncts offer effective post-operative management, with BlueM gel favored for rapid re-epithelialization.

**References:**

- [1] Çardakci Bahar Ş *et al.* *Clin Oral Investig.* 2024 **28**:85. [PMID: 38196007]
- [2] Agrawal AA. *World J Clin Cases.* 2015 **3**:779. [PMID: 26380825]
- [3] <https://www.ncbi.nlm.nih.gov/books/NBK535406/>
- [4] Bahadur R *et al.* *J Dent Panacea.* 2024 **6**:46. [DOI: 10.18231/j.jdp.2024.011]
- [5] Alayadi H *et al.* *Medicina (Kaunas).* 2024 **60**:1527. [PMID: 39336568]
- [6] Vahedi S *et al.* *Lipids Health Dis.* 2025 **24**:291. [PMID: 41024096]
- [7] Çolak R *et al.* *BMC Oral Health.* 2025 **25**:1642. [PMID: 41121063]
- [8] Sadighi M *et al.* *J Dent Res Dent Clin Dent Prospects.* 2022 **16**:135. [PMID: 36561388]
- [9] Ibrahim SSA *et al.* *J Appl Oral Sci.* 2024 **32**:e20230307. [PMID: 38536994]
- [10] Alayadi H *et al.* *Medicina (Kaunas).* 2024 **60**:1527. [PMID: 39336568]
- [11] Juliana H & Tarek S. *Saudi Dent J.* 2022 **34**:328. [PMID: 35692245]
- [12] Anzolin AP *et al.* *Med Gas Res.* 2020 **10**:54. [PMID: 32189671]
- [13] Patel MS *et al.* *Cureus.* 2025 **17**:e85001. [PMID: 40585734]
- [14] Tualzik T *et al.* *J Indian Soc Periodontol.* 2021 **25**:421. [PMID: 34667386]
- [15] Bozkurt E & Uslu MÖ. *Quintessence Int.* 2022 **53**:328. [PMID: 34927405]

*Caveat Emptor is applicable among the literate community where required and possible. The publisher, its journal, editors and the internal/external reviewers take adequate steps to check, evaluate, correct, edit, revise and improve content where possible and required.*