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PLACENTREX AND OZONATED OLIVE OIL: EMERGING MODALITIES IN PERIODONTAL HEALING – A COMPARATIVE CLINICAL STUDY

Ankita Garg[1*], Satendra Sharma[2]

[1] *Senior Resident, Department of Dentistry, Shyam Shah Medical College, Rewa, M.P, India.
[2]Reader, Department of Periodontology, Kanti Devi Dental College and Hospital, Mathura, Uttar Pradesh, India

***Corresponding Author:** Dr. Ankita Garg
*Email: anky14.ag@gmail.com

Abstract -
Aim: To assess the clinical efficacy of Placentrex gel and ozonated olive oil in promoting healing following laser gingival depigmentation.Materials and Methods: A split-mouth study was conducted involving subjects with gingival melanin hyperpigmentation in the maxillary and/or mandibular arches. Each site was randomly assigned to one of two treatment groups. Laser depigmentation was performed under local anesthesia using a diode laser. Post-procedure, Group 1 received ozonated olive oil (DENTOZONE INDIA), while Group 2 received Placentrex gel. Follow-up evaluations were conducted at 1 week, 2 weeks, and 1 month postoperatively, assessing the Healing Index and Visual Analog Scale (VAS) scores for pain.Results: Both groups exhibited statistically significant reductions in VAS scores for pain and discomfort, as well as improvements in healing at 1 and 2 weeks postoperatively. Notably, the Placentrex group demonstrated superior healing and reduced pain at 15 days compared to the ozonated olive oil group. However, at the end of the study period, no significant differences were observed between the two groups.Conclusion: Laser depigmentation followed by the application of Placentrex gel may facilitate faster healing and reduced pain in individuals with gingival melanin hyperpigmentation.

Keywords: Gingival hyperpigmentation, Laser, Placentrex, Ozonated olive oil.

Introduction

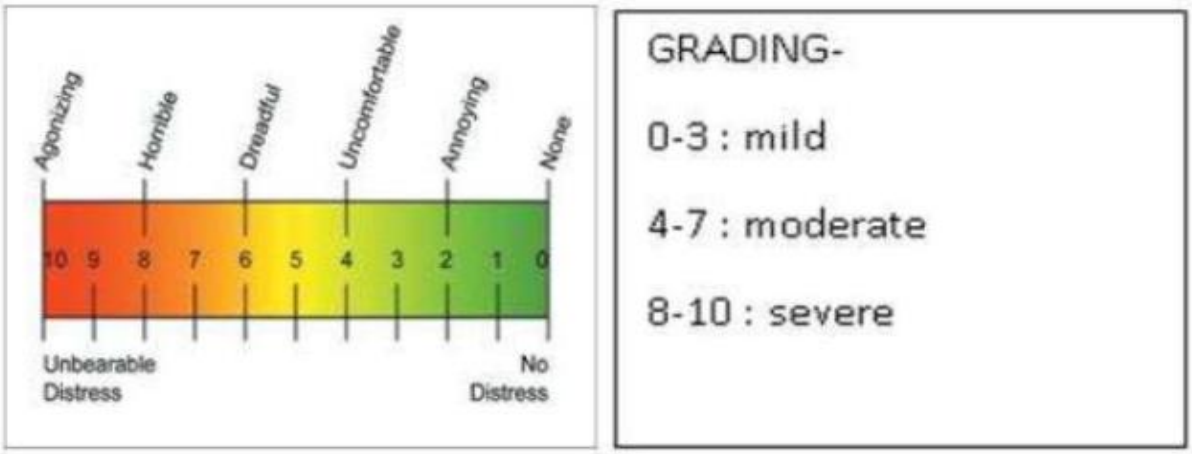
A captivating smile relies on the seamless integration of both dental and gingival elements. With increasing aesthetic awareness among patients, visible gingival pigmentation—especially on the facial aspect of the gums—can significantly affect self-esteem, particularly during speech and mastication. This concern is especially prevalent among individuals with a "gummy smile."Gingival hyperpigmentation refers to an abnormal darkening of the gums beyond the typical color. This condition can be categorized as a)Physiological (Racial): The most common form, resulting from melanin deposition due to genetic factors; b) Pathological Caused by various factors including Drug-induced pigmentation (e.g., chloroquine, quinine, contraceptives), Smoking-associated melanosis, Exposure to heavy metals like lead, bismuth, mercury, silver, and gold or Endocrine disorders such as Addison's disease. 1,2 Gingival depigmentation is a periodontal plastic surgical procedure aimed

at removing or reducing gingival hyperpigmentation through various techniques while not clinically necessary, it is often the preferred treatment for patients seeking improved aesthetics.3
Roshni & Nandakumar (2005) classified different gingival depigmentation methods as: I. Methods aimed at removing the pigment layer: A. Surgical methods of depigmentation a. Scalpel surgical technique b. Bur abrasion method c. Electro surgery d. Cryosurgery e. Lasers • Neodymium: Aluminium-Yttrium-Garnet (Nd:YAG) lasers • Erbium: YAG (Er:YAG) lasers • Carbon Dioxide (CO2) lasers f. Radiosurgery B. Chemical methods of depigmentation using caustic chemicals- this method is not used nowadays. II. Methods aimed at masking the pigmented gingiva with grafts from less pigmented areas A. Free gingival graft. B. Acellular dermal matrix allograft.3 In this study, the laser was considered for the depigmentation procedure followed by the application of Placentrex and ozonated olive oil. Laser therapy has excellent efficacy in the treatment of gingival hyperpigmentation. It is a solid-state semiconductor laser that changes electrical energy into light energy. It can be delivered through a flexible quartz fiber optic handpiece. The advantage of laser over other techniques is that it has enhanced hemostatic activity thus bloodless field allows good visibility at the surgical site. Less Postoperative complications such as less pain, bleeding, edema, infection, and impaired wound healing offers great comfort to the patients. The most commonly used lasers for gingival depigmentation are diode (980 nm) lasers, carbon dioxide (CO2, 10,600 nm) lasers, neodymium: Yttrium, aluminum, and garnet (Nd: YAG, 1,064 nm). Depigmentation was performed with short light paint brush strokes in an apicocoronal direction to remove the epithelial lining. The surgical site was wiped with gauze soaked in saline solution and the procedure was repeated till no pigments remained. Following the procedure, placentrex and ozonated olive oil were applied on the arches' left and right sides respectively.3 Historically, herbal medicines derived from natural sources have been utilized for their healing properties. In recent times, there has been a resurgence in the use of herbal remedies as alternatives to synthetic drugs, owing to their therapeutic benefits and minimal side effects. Ozone gas, due to its high reactivity and instability, poses challenges in storage and application. To enhance its stability and therapeutic utility, it is often combined with vegetable oils, notably extra virgin olive oil. This combination results in ozonated olive oil, which exhibits synergistic therapeutic effects. . Ozonated olive oil has unique therapeutic properties as a hemostatic agent, disinfectant, modulation of the inflammatory phase, stimulation of angiogenesis, and the biological and enzymatic reaction thus accelerating wound healing as well as antioxidant properties.4,5,6.These properties collectively accelerate wound healing and tissue regeneration. Placental extracts, such as Placentrex gel, have emerged as significant agents in modern medicine. Initially described by Russian ophthalmologist Filatov, these extracts function as biogenic stimulators. Placentrex promotes fibrogenesis, neoangiogenesis, and epithelialization, thereby enhancing wound healing. It accelerates cellular metabolism and activates tissue regenerative processes. Additionally, placental extracts exhibit anti-inflammatory and antiplatelet aggregation actions, making them beneficial as topical agents in wound management .10,11,12Given the remarkable properties of both ozonated olive oil and Placentrex gel, a study was conducted to investigate their clinical efficacy in promoting healing following laser gingival depigmentation procedures.

Materials And Methods

Subjects for the study were selected from the Outpatient Department, Department of Periodontology. 10 Patients with gingival hyperpigmentation ranging from 20-50 years of either sex were selected. All subjects included in the study were systemically healthy and cooperative. A signed informed consent form was taken. Exclusion criteria • Smokers and tobacco chewers, pregnant or lactating women, or women on oral contraceptives. • Patients undergoing orthodontic therapy. • Patients with a history of use of medications or nutritional supplements in the past six months. In this study, the cases were selected based on Dummett–Gupta oral pigmentation index (DOPI) (Dummett, 1971): 1. No clinical pigmentation (pink gingiva) 2. Mild clinical pigmentation (mild light brown color) 3. Moderate clinical pigmentation (medium brown or mixed pink and brown) 4. Heavy clinical pigmentation Dummet proposed the Dummet Oral Pigmentation Index (DOPI) assessment:

• Score 0: Pink tissue (No clinical pigmentation) • Score 1: Mild light brown color (Mild clinical pigmentation) • Score 2: Medium brown or blue-black tissue (Heavy clinical pigmentation)
• Score 3: Deep brown or blue-black tissue (Heavy clinical pigmentation). The anterior labial sextant of the maxilla & mandible was divided into two halves on each side. Each site was randomly divided into 2 groups. Laser depigmentation was performed under local anesthesia using a diode laser(980 nm). After the depigmentation procedure ozonated olive oil was applied in group 1 &Placentrax was applied in group 2. Clinical parameters such as pain & wound healing were assessed after one week, two weeks, and one month. Assessment Of Clinical Parameters (at postoperative 1 week,2 weeks, 1 month) 1. Visual analog scale (VAS) ratings for pain 2. Healing index (Landry, Turnbull, and Howley, 1988). 1. Visual Analog Scale



2. Healing Index (Landry, Turnbull, And Howley, 1988) Healing Index 1 - Very Poor: Has 2 or more of the following: (1) tissue color: ≥ 50% of gingiva red (2) response to palpation: bleeding (3) granulation tissue: present (4) incision margin: not epithelialized, with loss of epithelium beyond the incision margin (5) suppuration present Healing Index 2 – Poor: (1) tissue color: ≥ 50% of gingiva red (2) response to palpation: bleeding (3) granulation tissue: present (4) incision margin: not epithelialized, with connective tissue exposed Healing Index 3 – Good: (1) tissue color: ≥ 25% and < 50% of gingiva red (2) response to palpation: no bleeding (3) granulation tissue: none (4) incision margin: no connective tissue exposed Healing Index 4 - Very Good: (1) tissue color: < 25% of gingiva red (2) response to palpation: no bleeding (3) granulation tissue: none (4) incision margin: no connective tissue exposed Healing Index 5 – Excellent: (1) tissue color: all tissues pink (2) response to palpation: no bleeding (3) granulation tissue: none (4) incision margin: no connective tissue exposed.
Statistical Analysis Descriptive statistics were expressed as meansDescriptive statistics were expressed as means and standard deviations for each group. Within-group comparison for the parametric study variables (LHI) was analyzed using Paired t-test. Between-group comparisons for the parametric study, variables were analyzed using One way ANOVA test. Post hoc comparison was done using Bonferroni correction. Within-group comparison for the non-parametric study variables (VAS) was analyzed using Wilcoxon Signed Ranks Test. Between-group comparisons the non-parametric variables were analyzed using Kruskal Walis ANOVA and Mann-Whitney U test. In the above tests, a p-value less than or equal to 0.05 ($p \leq 0.05$) was taken as statistically significant. All analyses were performed using SPSS software version 17.

Results

There was a statistically significant reduction in Visual Analog Scale scores for pain and discomfort and improvement in healing in both groups. But when a comparison was done between the 2 groups subjects in the placentrex group showed faster healing and reduced pain after 1 week as well as after 15 days compared to subjects in ozonated olive oil group. Subjects of both groups after a month showed similar healing and pain reduction.

Tables

Table no.1: Intergroup comparison of the healing index scores among the two groups

Paired T-test

Group	Olive oil	Placentrex	Mean Difference	t -test	P-Value	Inferences
Day	Mean ± S.D	Mean ± S.D				
Day 7	3.40 ± 0.50	3.75 ± 0.44	-0.35	3.199	0.005	S
Day 15	4.30 ± 0.57	4.75 ± 0.44	-0.45	3.943	0.001	S
Day 30	5.00 ± 0.00	4.75 ± 1.12	0.25	1.000	0.330	NS

$p \leq 0.05$ is statistically significant

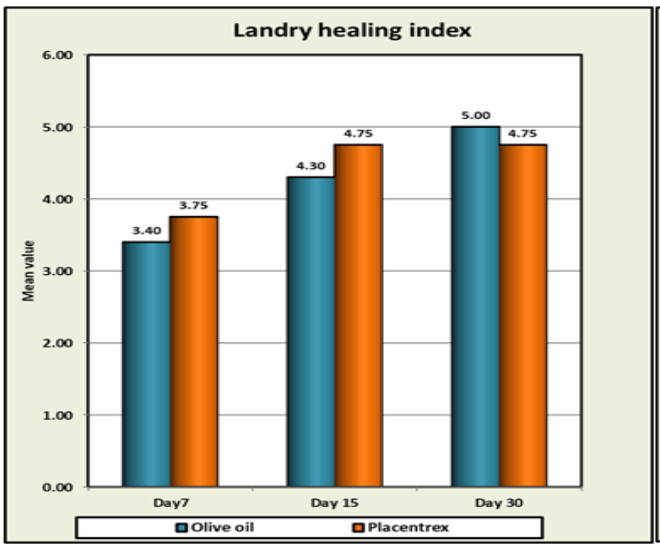
One Way Anova

Dependent Variable	(I) Day	(J) Day	Mean Difference (I-J)	P-value	Inferences
Olive oil	DAY 7	DAY 15	-0.90	0.000	S
		DAY 30	-1.60	0.000	S
	DAY 15	DAY 30	-0.70	0.000	S
Placentrex	DAY 7	DAY 15	-1.00	0.000	S
		DAY 30	-1.00	0.000	S
	DAY 15	DAY 30	0.00	1.000	NS

Multiple Comparisons

Multiple Comparisons

Dependent Variable	(I) Day	(J) Day	Mean Difference (I-J)	P-value	Inferences
Olive oil	DAY 7	DAY 15	-0.90	0.000	S
		DAY 30	-1.60	0.000	S
	DAY 15	DAY 30	-0.70	0.000	S
Placentrex	DAY 7	DAY 15	-1.00	0.000	S
		DAY 30	-1.00	0.000	S
	DAY 15	DAY 30	0.00	1.000	NS



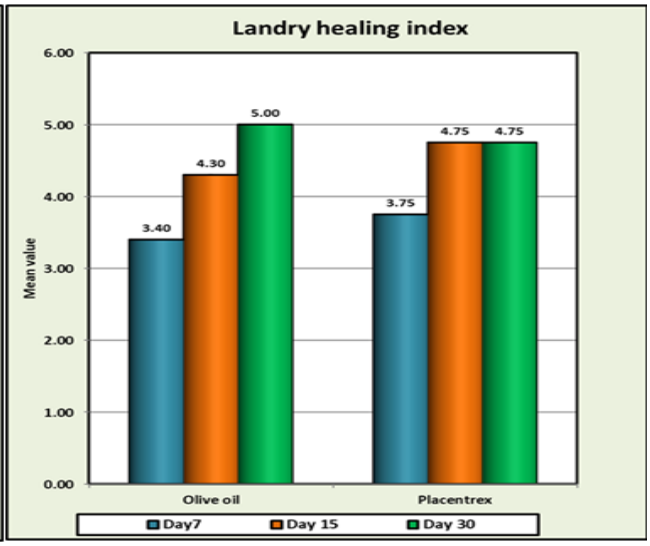


Table no.2: Change in VAS scores (for pain) among the two groups Wilcoxon Signed Ranks Test

Group	Olive oil	Placentrex	Mean Difference	Z	P-Value	Inferences
Day	Mean ± S.D	Mean ± S.D				
Day7	0.50 ± 0.51	0.25 ± 0.44	0.25	-2.236	.025	S
Day15	0.30 ± 0.47	0.00 ± 0.00	0.30	-2.449	.014	S
Day30	0.00 ± 0.00	0.00 ± 0.00	0.00	.000	1.000	NS

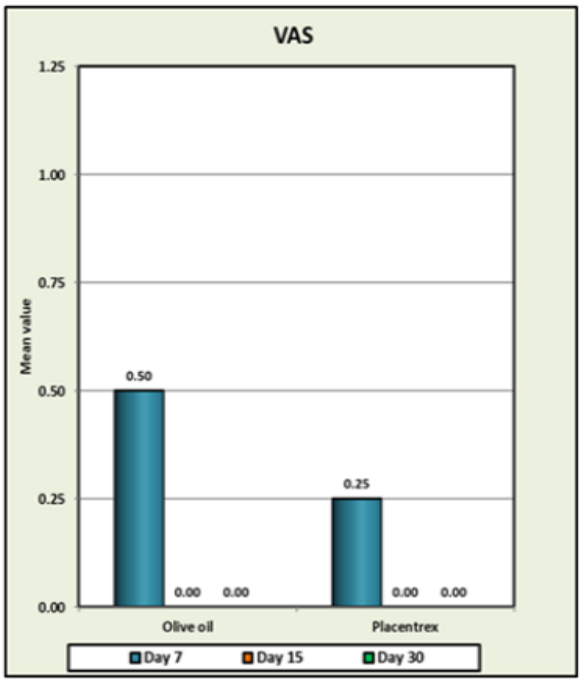
Kruskal Walis ANOVA

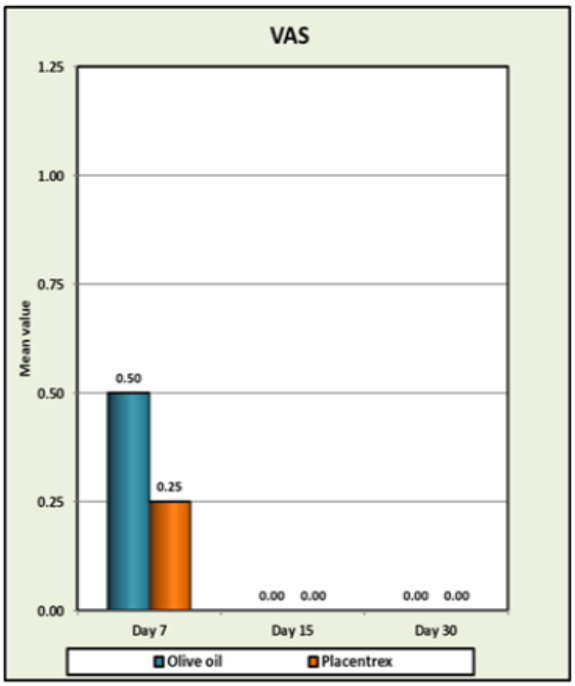
Groups	Days	N	Mean	S.D.	F	P-value	Inferences
Olive oil	DAY 7	20	0.50	0.51	7.848	0.001	S
	DAY 15	20	0.30	0.47			
	DAY 30	20	0.00	0.00			
Placentrex	DAY 7	20	0.25	0.44	6.333	0.003	S
	DAY 15	20	0.00	0.00			
	DAY 30	20	0.00	0.00			

Multiple Comparisons

Dependent Variable	(I) Day	(J) Day	Mean Difference (I-J)	P-value	Inferences
Olive oil	DAY 7	DAY 15	0.20	0.363	NS
		DAY 30	0.50	0.001	S
	DAY 15	DAY 30	0.30	0.065	NS
Placentrex	DAY 7	DAY 15	0.25	0.009	S
		DAY 30	0.25	0.009	S
	DAY 15	DAY 30	0.00	1.000	NS

Mann-Whitney U test





Armamentarium

Case pictures


Preoperative Intraoperative


Postoperative


Placentrex gel application


Ozonated olive oil application

Healing after 7 days

Healing after 15 days

Healing after 1 month

Discussion

Patients with excessive gingival display often seek treatment to enhance their smile aesthetics. Laser-assisted gingival depigmentation has emerged as a reliable and effective technique for addressing melanin-induced pigmentation.Wound healing is a complex physiological process involving tissue regeneration and restoration of function. The placenta, a maternofetal organ, is rich in biologically active components that contribute to healing. Placental extracts, such as Placentrex gel, have been shown to stimulate neural, hormonal, and immune responses, thereby enhancing collagen synthesis and accelerating tissue repair. Additionally, they activate the clotting cascade, promoting platelet aggregation and further supporting the healing process.11

Ozonated olive oil, developed by infusing ozone into olive oil over an extended period, has been recognized for its therapeutic properties, including hemostatic, antimicrobial, and antioxidant effects. Clinical studies have demonstrated its efficacy in wound healing, promoting tissue repair and reducing inflammation. For instance, a study on guinea pigs revealed that topical application of ozonated olive oil accelerated acute cutaneous wound healing, evidenced by increased collagen fibers and fibroblast numbers, along with upregulated expressions of growth factors like PDGF, TGF-beta, and VEGF. Similarly, placental extracts, such as Placentrex gel, have been recognized for their regenerative properties. They promote fibrogenesis, neoangiogenesis, and epithelialization, thereby enhancing wound healing. Placentrex also accelerates cellular metabolism and activates tissue regenerative processes, making it beneficial as a topical agent in wound management. In a clinical study comparing the effects of ozonated olive oil and photobiomodulation (PBM) using a diode laser on gingival depigmented wounds, ozonated olive oil was found to be more efficacious in promoting early wound healing and epithelialization, especially noted on the third day post-procedure. 7,8,9

However, to date, there is a lack of direct comparative studies assessing the healing efficacy of Placentrex gel versus ozonated olive oil following laser depigmentation procedures. Further research is warranted to establish definitive conclusions on their relative effectiveness in such clinical scenarios.

Conclusion

The current study indicates that individuals with gingival melanin hyperpigmentation experience more rapid healing and reduced discomfort when laser depigmentation is followed by the application of Placentrex gel, compared to the use of ozonated olive oil. Nevertheless, additional long-term research involving larger sample sizes is necessary to draw definitive conclusions.

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