COMPARATIVE EVALUATION BETWEEN RELATIVE EFFICACY OF THREE PERIODONTAL DRESSINGS AFTER CONVENTIONAL DEPIGMENTATION: A CLINICAL STUDY

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ABSTRACT
The guiding principle for depigmentation treatment is the patient’s concern with respect to his/her cosmetic appearance. So, the present study was carried out to determine the efficacy of three different types of non-eugenol periodontal dressings namely Coe-pak, Barricaid and Cyanoacrylate dressings after performing conventional depigmentation. To achieve this aim, the following objectives evaluated post-operatively were colour of the gingiva, area of pigmentation and post-operative pain at 1 week, 1 month and 3 months postoperatively. Area of pigmentation at baseline was measured for all the three groups No repigmentation occurred at one week and one month time period but at 3 month recall, some patches of pigmentation were present which were measured. When post-operative pain was measured, statistically significant results were seen in intra-group comparison from baseline to one week and from one week to 1 month, whereas non-significant results were seen on inter-group analysis between the three dressings at all time points. All the three periodontal dressings demonstrated improvement in the colour of gingiva, area of pigmentation and post-operative pain. Within the limitations of this study, there was no statistical significant difference between the three periodontal dressings.

Keywords: Depigmentation, Coe-pak, Barricaid, Cyanoacrylate, Periodontal dressings.

INTRODUCTION
Intra oral soft tissue aesthetics has become a significant aspect of dentistry and clinicians are faced with achieving acceptable gingival aesthetics as well as addressing biologic and functional problems. On the increasing demand of aesthetics, numerous procedures have been performed such as gingivectomy, gingivoplasty, connective tissue grafting and guided tissue regeneration to improve gingival architecture [1]. Gingival & cutaneous melanin pigmentation is often a source of aesthetic problems. The colour of the attached and marginal gingiva is generally described as coral pink. It is determined by several factors including the number and size of blood vessels, epithelial thickness, quantity of keratinization and pigments within the epithelium [2]. Hyperpigmentation of the gingiva is benign in most cases and does not present a medical concern [3]. The guiding principle for depigmentation treatment of the lesions is the patient’s concern with respect to his/her cosmetic appearance. Indeed, an increasing number of persons are seeking treatment for this condition [4]. In most cases, after the surgical periodontal procedures are completed, the area is covered with a surgical pack. In general, dressings have no curative properties, they assist healing by protecting the tissue rather than providing ‘healing factors’. The pack minimizes the likelihood of post-operative infection and hemorrhage, facilitates healing by preventing surface trauma during mastication, and

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protects against pain induced by contact of wound with food or the tongue during mastication [5].

Periodontal dressings are usually divided into eugenol and non-eugenol groups. The former are based on zinc oxide and eugenol with various additives. Eugenol based dressings were formerly popular, especially following gingivectomy. However, the persistent taste of eugenol, the rough surface of the set material, and the tendency to cause tissue necrosis (particularly of bone), and hence to delay healing, led to the introduction of non-eugenol dressings in the late 1950’s [6]. A commonly used periodontal dressing is Coe-Pak® (Coe Laboratories Inc., Chicago, IL, US), which is supplied in two tubes. One tube contains oxides of various metals (mainly zinc-oxide) and lorothidol (a fungicide). The second tube contains non-ionizing carboxylic acids and chlorothromyl (a bacteriostatic agent) [7]. A light curing dressing, e.g. Barricaid® (Dentsply International Inc., Milford, DE, US), is useful in the anterior tooth region and particularly following mucogingival surgery, because it has a favourable aesthetic appearance and it can be applied without dislocating the soft tissue. However, the light curing dressing is not the choice of dressing to be used in situations where the flap has to be apically retained, due to its soft state before curing [7]. Cyanacrylates (XOIN®) (Reevax Pharma Private Limited, Hyderabad, India) have also been used as periodontal dressings with varying success. Dressings of the cyanacrylate type are applied in a liquid directly onto the wound or sprayed over the wound surface. Although the application of this kind of dressing is simple, its properties often do not meet clinical demands, which is why its use is rather limited at present [7]. Till date very few studies have been done comparing the effect of various dressing materials on gingival depigmentation. So, the present study was carried out to determine the efficacy of three different types of non- eugenol periodontal dressings namely Coe-pak®, Barricaid® and Cyanacrylate (XOIN®) dressings in after performing conventional depigmentation.

**MATERIAL & METHODS**

The aim of the present study was to assess clinically the relative efficacy of 3 different periodontal dressings (Coe-pak®, Barricaid®, XOIN® and Cyanacrylate dressing) after conventional depigmentation. To achieve this aim, following objectives were evaluated at baseline, 1 week, 1 month and 3 months post-operatively: a) Colour of the gingiva, b) Area of pigmentation, c) Post operative pain. The study was conducted in 30 healthy subjects, aged between 18-40 years, with gingival hyperpigmentation from patients visiting the regular OPD of Department of Periodontology, Subharti Dental College, Meerut. These subjects were randomly allocated in 3 equal groups with 10 subjects in each group (Fig. 1A, 2A, 3A): Group 1: Patients were subjected to conventional scalpel depigmentation and then wound area was covered with Coe-pak® application (Fig. 1B). Group 2: Barricaid® (Light-cured periodontal dressing) application (Fig. 2B). Group 3: XOIN® (Cyanacrylate dressing) application (Fig 3B). Inclusion criteria were: 1) Presence of a continuous band of gingival Hyperpigmentation in the intercanine region in maxilla / mandible, 2) Patients with esthetic concern, 3) Patients with good oral hygiene. Exclusion criteria of the study were: 1) Age <18 years and > 40 years, 2) Presence of habits- Tobacco use, Smoking, Alcohol or Drugs related, 3) Presence of systemic disease or pregnancy, 4) Presence of use of any metal-containing medications, 5) Occupational history of working in metal, cement and asbestos factories, 6) Uncooperative patients. The procedure was informed to the patients and consent form, duly signed by the patient was obtained. The following parameters were recorded on the performa designed for the study: 1) Demographic data, medical history, dental history, personal history and occupational history. 2) Clinical examination of the dentition and oral mucosa. 3) Base line parameters: a) Colour of gingival pigmentation: Mild (pink to slightly brown), Moderate (deep brown to black), Severe (mixed colour) b) Area of pigmentation, c) Evaluation of post operative pain

Methodology: All patients were subjected to phase I therapy comprising of plaque control instructions, scaling and polishing. Colour density of gingival pigmentation was assessed using the following criteria.

Method to measure the surface area of pigmentation: The total surface area of pigmentation of each patient was measured with the help of standardized photograph taken preoperatively. The camera used for the study was Sony Cyber-shot DSC-T90, 12.1 megapixels digital camera and the photographs were taken with the resolution 1024x640 dpi. For calibration of the photographs, the actual dimension of the intercanine region of each patient was measured with the help of a digital vernier calliper. The tips of the jaws of the vernier calliper were placed at the tips of the interdental papillae between canine and first premolar on each side. The area was then calculated with the help on an image analysing software (Adobe Photoshop 6). The area calculated for the study included the gingiva of inter canine region. Grid lines were drawn for every 1 cm. and these were further divided by 10 thus providing with squares of 1 sq mm. The pigmented area was outlined. By calculating the number of squares which had pigmentation gave the total surface area of pigmentation.

Conventional depigmentation procedure: Local anaesthesia was obtained using 2% lignocaine with infiltration in relation to surgical site. The excision involved excising the entire pigmented area extended from the free gingival margin to the mucogingival
junction from the intercanine region with the blade placed almost parallel to the long axis of the teeth with care taken not to expose the underline bone. This was followed by careful examination of the exposed connective tissue surface and remaining tissue tags were removed. Bleeding was controlled by pressure pack. Once haemostasis was achieved, the site was covered by periodontal dressings for 1 week. i.e. GROUP I (Conventional Depigmentation with Coe-Pak® Dressing Application), GROUP II (Conventional Depigmentation with Barricaid Dressing® Application), GROUP III (Conventional Depigmentation with XOIN® Cyanoacrylate Dressing Application). Subjects in all the groups were followed up at 1 week, 1 month and 3 months postoperatively. They were evaluated for efficacy of periodontal dressings. The gingival colour, area of regeneration and post operative pain, were recorded at these intervals.

Evaluation of post-operative pain

Visual Analog Scale: Visual Analogue Scale (VAS) was given by Scott and Huskisson in 1979, and it is a measurement parameter that tries to measure a characteristic or attitude that is believed to range across a continuum of values and cannot easily be directly measured. For example, the amount of pain that a patient feels ranges across a continuum from none to an extreme amount of pain. From the patient's perspective this spectrum appears continuous ± their pain does not take discrete jumps, as a categorization of none, mild, moderate and severe would suggest. It was to capture this idea of an underlying continuum that the VAS was devised. Operationally a VAS is usually a horizontal line, 100 mm in length, anchored by word descriptors at each end, as illustrated below. The patient marks on the line the point that they feel represents their perception of their current state. The VAS score is determined by measuring in millimetres from the left hand end of the line to the point that the patient marks.

![Visual Analogue Pain Scale](image)

Figure 1. Visual Analogue Pain Scale

Statistical Analysis

All the values were expressed in the form of mean, standard deviation and one-way analysis variance (ANOVA). The parameters of colour of gingiva and evaluation of pain were compared between inter and intra group and Area of pigmentation was compared between inter group using one-way analysis variance (ANOVA). Area of pigmentation was compared between intra group using Mean and Standard Deviation. The analysis was performed by The Data Analysis Software through Microsoft Excel.

RESULTS

The results of this study were as follows:

Colour of Gingiva: The colour of gingiva was assessed on a scale of 1-3, which was interpreted as: Mild (pink to light brown), Moderate (dark brown to black) and Severe (mixed colour). The colour of gingiva was dark brown to black at baseline in all subjects recruited in the study. In Group 1, one week post-operatively the colour changed to reddish pink to pink in all the 10 subjects and at one month post-operatively, the colour changed to mild (pink to light brown) in 9 subjects and in one subject slight brown colour reappeared. At 3 months post-operatively, the colour was recorded as pink in 7 subjects and mild brown colour was seen in 3 subjects due to re-pigmentation. One way ANOVA “F” test was applied for intra-Group comparison and statistically significant result was obtained from baseline to 3 months (p = 0.0000658, p < 0.05). In Group 2, one week post-operatively, the colour changed to reddish pink to pink in all the 10 subjects. At one month postoperatively, the colour changed to mild (pink to light brown) in 9 subjects and in one subject slight brown colour reappeared. But at 3 months post-operatively the colour was recorded as pink in 6 subjects and mild brown colour was seen in 4 subjects due to re-pigmentation. One way ANOVA “F” test was applied for intra-Group comparison and statistically significant result was obtained from baseline to 3 months (p = 0.003624, p < 0.05). In Group 3, four subjects with mild and 6 subjects with moderate pigmentation were included in the study. At one week and one month post-operatively the colour changed to reddish pink to pink in all the 10 subjects with no subject with re-pigmentation. But at 3 months postoperatively the colour was recorded as pink in 8 subjects, and mild brown colour was seen in 2 subjects due to re-pigmentation. One way ANOVA “F” test was applied for Intra-Group comparison and statistically significant result was obtained from baseline to 3 months. (p = 0.005682, p < 0.05). On Inter-Group comparison statistically insignificant result was observed at baseline (p = 0.42544, P > 0.05) 1 month (p = 0.61203, p > 0.05) and 3 months (p = 0.64692, p > 0.05)

Evaluation of Pain: In Group 1, no pain was recorded on the day of treatment in 7 subjects but mild pain in 3 subjects. Pain during the first week after conventional depigmentation treatment was recorded and only 2 subjects experienced no pain, mild pain was observed in 3 subjects and 5 subjects observed moderate pain. Pain on 1 month and three months were also recorded. Among 10 subjects, only 1 subject experience mild pain, and 9 subjects having no pain on 1 month. One way ANOVA “F” test was applied and analysis showed statistically significant result at all time points (p=0.0000314, p <
0.05). In Group 2, no pain was recorded on the day of treatment in 6 subjects but mild pain in 3 subjects and moderate pain in 1 subject. At 1 week, four subjects experienced no pain, mild pain was observed in 4 subjects and 2 subjects observed moderate pain. Only 1 subject experienced mild pain, and 9 subjects having no pain on 1 month. One way ANOVA “F” test was applied analysis showed statistically significant result at all time points (p=0.00906, p < 0.05). In Group 3, no pain was recorded on the day of treatment in 8 subjects but mild pain in 2 subjects. At 1 week, only 3 subjects experienced no pain, mild pain was observed in 5 subjects and 2 subjects observed moderate pain. No pain was recorded in 7 subjects on 1 month but mild pain in 2 subjects and moderate in 1 subject was observed. One way ANOVA “F” test was applied analysis showed statistically significant result at all time points (p = 0.00572, p < 0.5). But no pain was observed on 3 month post operative recall in any subject in any group. One way ANOVA “F” test was applied for Inter-Group analysis and it was observed that statistically significant results were obtained at all time points. Unpaired “t” test was applied between different dressings with regard to pain score and it was found to be statistically insignificant at all time points (baseline, 1 week, 1 month and 3 months).

**Area of Pigmentation:** In Group 1, the area of pigmentation at baseline was calculated as 1090.045 ± 426.737 mm², as no re-pigmentation occurred at one week and one month so it become 0 (zero) and at 3 month recall, the area of pigmentation was calculated as 14.4 ± 26.613mm² (Fig. 1C). One way ANOVA “F” test was applied for Intra-Group comparison and statistically significant result was obtained from baseline to 3 months. (p = 0.000000265, p < 0.05). In Group 2, the area of pigmentation at baseline was calculated as 1338.416 ± 427.083mm², which changed to 27.9 ± 70.15mm² at 3 months post-operative recall (Fig. 2C). One way ANOVA “F” test was applied for Intra-Group comparison and statistically significant result was obtained from baseline to 3 months. (p = 0.0000000173, p < 0.05). In Group 3, the area of pigmentation at baseline was calculated as 1235.125 ± 448.752mm², which changed to 1.3 ± 2.98mm² at 3 month recall postoperatively (Fig. 3C). One way ANOVA “F” test was applied for Intra-Group comparison and statistically significant result was obtained from baseline to 3 months. (p = 0.0000000734, p < 0.05). One way ANOVA “F” test was applied for Inter-Group comparison, statistically insignificant result was observed at baseline (p = 0.4488, p > 0.05) and at 3 months (p = 0.402627, p > 0.05).
DISCUSSION

Gingival pigmentation is not confined to the black population. Gingival melanin hyperpigmentation is not a medical problem, but ‘black gums’ are a common complaint and people with moderate or severe gingival pigmentation frequently request cosmetic therapy. Gingival health and appearance are essential components of an attractive smile [2]. The most frequent cause of gingival pigmentation is melanin, though other pigments, such as carotene, oxyhemoglobin and reduced hemoglobin, which contribute to the normal color of the integument, are also found in the masticatory mucosa [8]. Melanin is the fundamental pigment that colours the tissues. It is a non–hemoglobin-derived pigment formed by the cells called melanocytes, which are dendritic cells of neuroectodermal origin located in the basal and spinous layers of the gingival epithelium. Melanin granules are phagocytosed and contained within other cells of the epithelium and connective tissue, called melanophages or melanophores. When melanin granules synthesized by melanocytes are transferred to keratinocytes, this relationship between melanocytes and keratinocytes was labelled by Fitzpatrick and Breathnach [9] as the epidermal-melanin unit. Oral melanin pigmentation may be physiologic or pathologic and it may occur in all races of man and in all nationalities. Various researchers like Dummett and Bares [10], Seiji et al [11], Fitzpatrick [9], Squier et al [12], Fun hu [13], and Szabo et al [14] had observed the presence of melanin pigmentation in oral tissues of subjects with varying ethnic origins. Many techniques has been tried in the past to treat gingival pigmentation which include chemical cauterization and abrasion of gingiva (Hirschfeld & Hirschfeld) [15], epithelial excision by scalpel (Almas and Sadig) [16], electrosurgery (Kasagani et al) [17] and laser therapy (Lagdive et al) [18]. In the present study, conventional depigmentation was performed for all the groups by scalpel as it is a simple surgical technique of de-epithelialization. It involves surgical removal of gingival epithelium along with a layer of connective tissue and allows the denuded connective tissue to heal by secondary intention. This was followed by placement of three different types of periodontal dressing (10 cases each) to assess their efficacy. The healing was uneventful in all the cases and gingiva appeared pink, healthy and firm giving a normal appearance. Three commercially available non-eugenol periodontal dressings were used in the study, namely Coe-pak®, Barricaid®, XOIN® (Cyanoacrylate) dressings were evaluated on colour of gingiva, area of pigmentation and pain. The colour of gingiva was dark brown to black at baseline in all subjects recruited in the study. After conventional depigmentation, the colour changed to reddish pink to pink at one week and remained pink at one month and 3 months post-operatively. Statistically significant changes were seen from baseline to 3 months in all the three dressings but no significant changes were seen from one week till 3 months. Intergroup comparison was also statistically insignificant. Similarly, area of pigmentation at baseline was measured for all the three groups and no repigmentation occurred at one week and one month time period but at 3 month recall, some patches of pigmentation were present which were measured. These patches were found to be statistically insignificant on inter-group comparison between the three dressings. Most of the studies have shown similar results after depigmentation [16, 17, 19] at 3 months time period but when observed over longer time frame, repigmentation generally re-occurs after 1.5 to 3 years [20]. In the present study, patches of repigmentation were seen in few cases at 3 months time period and these results are in accordance with study of Prasad et al [21] who also reported repigmentation can occur from 24 days to 8 years. To study the effect of these dressings on healing, post-operative pain was kept as one of the criteria. Visual analogue scale (VAS) and verbal rating scale (VRS) have been used in the past by many studies to assess pain. But as VAS is known to be more reliable and sensitive than verbal rating scale (VRS) [22] the present study used VAS to assess pain. VAS places minimal demand on patients in acute pain during the post-operative course, and the nature of the scale is usually grasped with little difficulty. The experience of pain is a
a clinician can use one of the above dressings according to their choice and availability.

REFERENCES


