

# FROM BLACK TO PINK: A SPLIT MOUTH COMPARATIVE EVALUATION BETWEEN SCALPEL AND ROTARY ABRASIVE USED FOR DEPIGMENTATION

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## ABSTRACT

Gingival hyperpigmentation is a major concern for many people for esthetics. It is corrected by various periodontal plastic surgical procedures. Various techniques had been introduced like scalpel, electrosurgery, cryosurgery, laser as well as power driven rotary abrasive method and masking procedures like FMG and ADM allografts. This paper will highlight a comparative evaluation between scalpel and rotary abrasive technique.

## KEY WORDS

**Depigmentation, conventional scalpel method, rotary abrasive method, surgical time, visual analogue scale-pain index, wound healing index, melanin pigmentation score.**

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## INTRODUCTION

There is an increasing demand for esthetics in recent years for pleasing smile in particular individual with black or dark pigmentation on facial aspect of gingiva<sup>1</sup>. Gingival hyperpigmentation is a deposition of melanin produced by melanoblasts located between epithelial cells in the basal layer of gingival epithelium. It can be physiologic (racial pigmentation) or pathologic due to drugs, heavy metals, genetics and systemic illness like Addison's disease, Peutz-Jeghers syndrome and neurofibromatosis<sup>2</sup>.

Gingival depigmentation is a procedure in which gingival hyperpigmentation is removed by various techniques which should be based on clinical expertise and individual preferences as an indication to improved esthetics<sup>3,4</sup>.

### Different technique for depigmentation include:-

1. De-epithelization:
  - a. Scalpel technique.
  - b. Gingival abrasion technique using diamond bur.
  - c. Combination of scalpel and bur.
2. Gingivectomy.
3. Free gingival autografting.
4. Acellular dermal matrix allograft (ADMA).
5. Electrosurgery.
6. Cryosurgery
  - Using liquid nitrogen.
7. Chemical agents
  - 95% phenol and 95% alcohol.
8. Laser:
  - a. Nd:YAG.
  - b. Semiconductor diode laser.
  - c. CO<sub>2</sub> laser.
  - d. Argon laser.

## Surgical technique

For this randomized, split mouth comparative evaluation, we have selected only first and second quadrant in all the three cases. Depigmentation was done by scalpel in one quadrant

and by rotary abrasive in the opposite side. The entire procedure was explained to all patients and informed consent and permission for publication taken. Ethical committee clearance taken from Dr. R Ahmed Dental College & Hospital. A complete medical history and blood investigations are carried out to rule out any possible contraindication during surgery. Pre-surgical preparation done by scaling and root planning, oral hygiene instructions, and dietary evaluation.

**Depigmentation by scalpel:**

After administration of local anaesthesia (Lignocaine hydrochloride with 1:80,000 epinephrine), a scalpel with a no.15 Bard Parker blade was used to remove the pigmented layer. A pressure was applied with normal saline soaked sterile gauze to control haemorrhage during the procedure. The pigmented epithelium with a thin layer of connective tissue was removed. The exposed

wound surface was irrigated with saline and after haemostasis it was covered with a periodontal dressing (Coe-Pak).

**Depigmentation by rotary abrasive:**

Similarly, a high speed hand piece with rotary abrasive with copious normal saline irrigation was used to remove the pigmented epithelium. Pressure was applied with saline soaked sterile gauze and the pigmented epithelium with a thin layer of connective tissue removed. Post surgical periodontal dressing was given. Care was taken to apply minimum pressure with feather light brushing strokes and without holding it into one place and continuous irrigation with normal saline is mandatory.

In all cases same post-surgical antibiotics (Amoxicillin 500mg, 8 hourly for 5 days) and analgesics (Ibuprofen 400 mg, 8 hourly for 3 days) and proton pump inhibitor once daily (Pantoprazole 40 mg) were prescribed. The patient was advised to

**CASE 1**



Pre-operative view



Perioperative-surgical



Immediate surgical



Immediate surgical



Coe-Pak given



7 days follow up



15 days follow up



3-month follow up

## CASE 2



Pre-operative view



Perioperative-rotary



Immediate surgical



Coe-Pak given



7-days follow up



Perioperative-surgical



Immediate surgical



Coe-Pak given



15-days follow up



3- months follow up

rinse with chlorhexidine(0.2%) mouthwash 12 hourly for 2 weeks 1 day onwards. The patient was reviewed at the end of 1 week was found to be satisfactory.

### Clinical evaluation

#### Parameters used:-

**1. Time:** Time taken for surgery by scalpel along with periodontal pack(Coe Pak)placement in case-1 was 22 min 58 second, case-2 was 19 min 08 second and in case-3, 21 minute 36 second. Whereas, time

taken for surgery by rotary abrasive along with periodontal pack(Coe Pak)placement in case-1 is 12 minute 8 second, case-2 is 07 min 10 second, and in case-3, 11 minute 24 second.

#### 2. Melanin pigmentation index (Takashi et al.)<sup>5</sup>

The degree of melanin pigmentation was determined by melanin pigmentation index based on the following scoring system :

**3. Visual analog scale for pain (VAS-PAIN):**  
The visual analog scale (VAS) was used to evaluate

### CASE 3



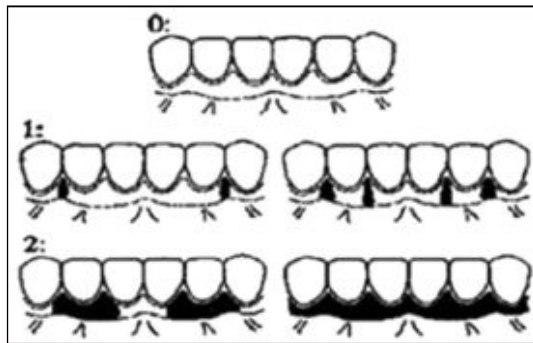
the subjective pain level experienced by the patient. The VAS consisted of a horizontal line of 10 cm (100 mm) long, anchored at the left end by the descriptor "no pain" and at the right end by "unbearable pain". The patient was asked to mark the severity of the pain. The distance of this point, in centimetres, from the left end of the scale was recorded and used as the VAS score: 0 cm= no pain; 1-3 cm= slight pain; 3.1-6 cm = moderate pain; 6.1-10 cm= severe pain.

**4. Wound healing:** Wound healing was evaluated based on the following scores: A. Complete

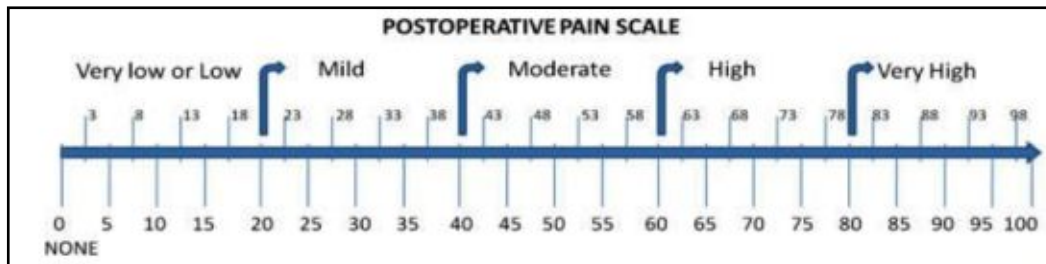
epithelization, B. Incomplete epithelization, C. Ulcer, D. Tissue defect or necrosis.

In this present study the melanin pigmentation index reveals, melanin pigmentation after 1 day is greater in case-3 than case-1 and case-2 in rotary abrasive method; whereas, in the scalpel method it is same (Case-1) or slightly more (Case-2 and Case-3), compared to rotary abrasive method.

Mean melanin pigmentation index showed a little recurrence with time. Although, ANOVA says that these changes are not statistically significant ( $p < 0.05$ ).



Score 0: No pigmentation  
 Score 1: Solitary unit(s) of pigmentation in papillary gingiva without extension between neighbouring solitary units  
 Score 2: Formation of continuous ribbon extending from neighbouring solitary units.



Patient perceptions related to pain and discomfort post operatively was assessed by a visual analog scale (VAS)

	Pre-op.	7 days post-op diamond abrasive method	7 days post-op scalpel method	15 days post-op diamond abrasive method	15 days post-op scalpel method	6 month post-op diamond abrasive method	6 month post-op scalpel method
case 1	A	C	B	B	A	A	A
case 2	A	B	B	A	A	A	A
case 3	A	C	B	A	A	A	A

Table 1: showing wound healing wound healing index showing scalpel method has a better wound healing than rotary abrasive method.

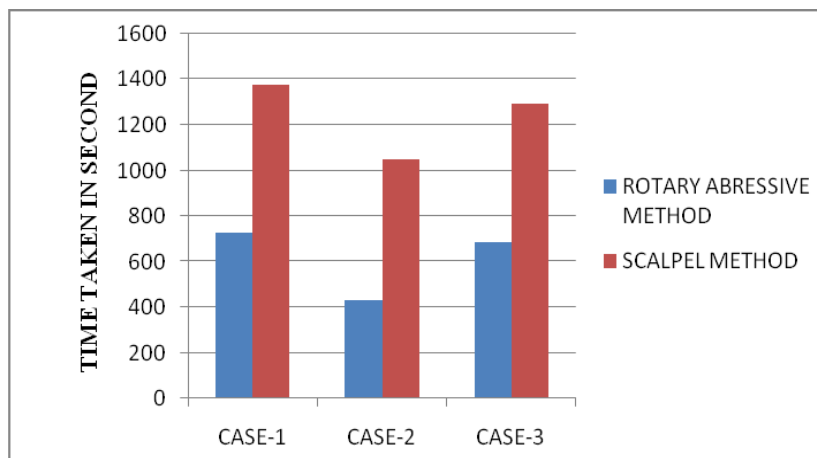


Figure 1: Rotary abrasive taken less time than scalpel and ANOVA says it is statistically significant ( $p < 0.05$ ).

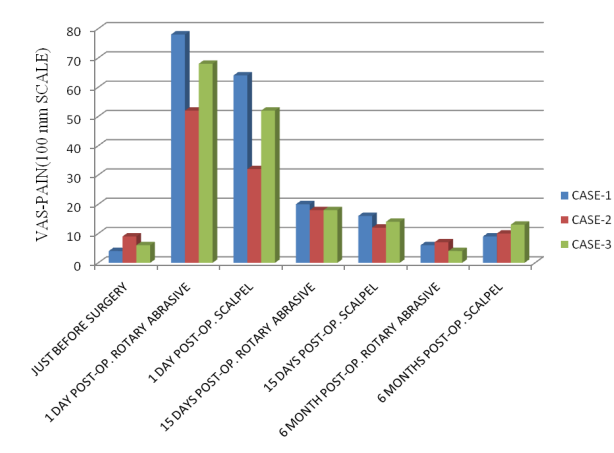


Figure 2: Here the Visual Analogue Scale is suggestive of, pain decreases gradually after surgery and remains more or less same after 6 month. The scalpel method is better initially (upto 15 days follow up), whereas, in the 6 month follow up rotary abrasive proved to be better. There was a decrease in pain between 1 day and 15 days and ANOVA says that there is statistically significant difference ( $p < 0.05$ ).

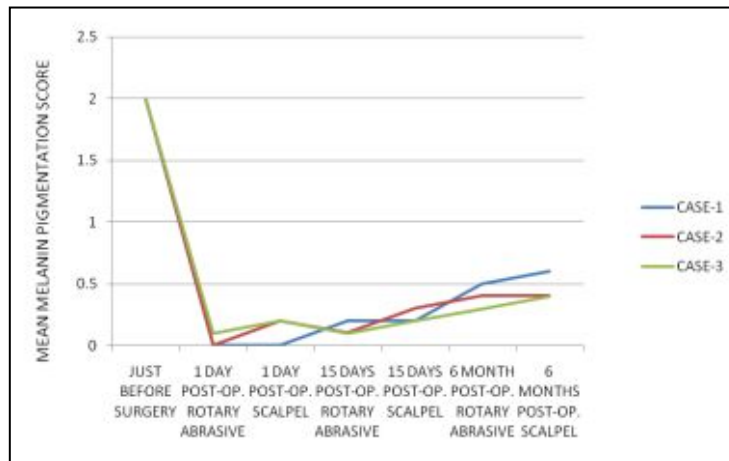


Figure-3 Shows Mean Melanin Pigmentation Index In Different Time Period

## RESULT

Scalpel method requires more surgical time than rotary abrasive method (Figure-1). As the patient was under anaesthesia, evaluation of pain was done 1 day postoperatively. Healing was uneventful in 1st week with pink color comparable to nearby non-treated area, resulting in a significant improvement in esthetic appearance. Patient's acceptance of the procedure was good and results were excellent as perceived by the patient. Compared to scalpel blade and rotary abrasion depigmentation, rotary abrasion method showed delayed healing initially [Table 1]. At the VAS evaluation, sites operated on with rotary abrasive the patient complained of moderate pain, but at the site treated with scalpel blade, less pain was recorded. However, the pain had reduced considerably 1 week after the surgery [Figure-2]. The MPI score also showed that there was a little recurrence of pigmentation after 6 months.(Figure-3)

## DISCUSSION

Gingival melanin pigmentation occurs in all races<sup>6</sup>. Gingival pigmentation appears in the gingiva as early as 3 hour after birth, and it is known to be the evidence of pigmentation<sup>7</sup>. Melanin, a brown pigment, is the most common natural pigment contributing to endogenous pigmentation of gingiva and also the gingiva is the most predominant site of pigmentation on the mucosa. Melanin pigmentation is the result of melanin granules produced by melanoblasts intertwined between epithelial cells at the basal layer of gingival epithelium<sup>8</sup>. Clinically esthetics can be measured by melanin pigmentation index, wound healing index and visual analogue scale<sup>9</sup>.

### *Gingival abrasion technique using scalpel*

Scalpel depigmentation is simple, effective, and economical of all the other techniques. Advantages which include wound healing are faster. Demerits of

scalpel technique are excessive bleeding in the operating area, postoperative pain, and discomfort and time<sup>10</sup>. One of the first, and still popular, techniques to be employed was the surgical removal of undesirable pigmentation using scalpels. The procedure essentially involves surgical removal of gingival epithelium along with a layer of the underlying connective tissue and allowing the denuded connective tissue to heal by secondary intention. The new epithelium that forms is devoid of melanin pigmentation<sup>11</sup>. Also, the healing period for scalpel wound is faster than other techniques. However, it might result in unpleasant hemorrhage during or after surgery. Hence, it is necessary to cover the lamina propria with periodontal dressing for 7–10 days<sup>12</sup>. This technique is highly recommended in the Indian subcontinent considering equipment constraints and patient affordability<sup>12</sup>.

However, scalpel surgery causes unpleasant bleeding during and after the operation, and it is necessary to cover the surgical site with periodontal dressing for 7–10 days. The area healed completely in 10 days with normal appearance of gingiva. We found that the scalpel technique was relatively simple and versatile and that it required minimum time and effort.

#### ***Gingival abrasion technique using diamond bur***

The process of healing in this method is similar to the scalpel technique. It is also a comparatively simple, safe and non-aggressive method that can be easily performed and readily repeated, if necessary, to eradicate any residual repigmentation<sup>13</sup>. Also, these techniques do not require any sophisticated equipment and are hence economical. Pre- and post-surgical care is similar to that of the scalpel technique. However, extra care should be taken to control the speed and pressure of the hand piece bur so as not to cause unwanted abrasion or pitting of the tissue. Minimum pressure with feather light brushing strokes with copious saline irrigation should be used without holding the bur in one place to perceive excellent results<sup>14</sup>.

In this present study, different parameters were used to assess predictability of two different methods. Time taken for rotary abrasive for surgery by scalpel method is more than using rotary abrasive. Melanin pigmentation index reveals that melanin pigmentation after 1 day is greater in case-3 than case-1 and case-2 in rotary abrasive method, whereas in scalpel method it is same in case-1 or slightly more in case-2 and case-3 when compared to rotary abrasive method. Visual analog scale for pain suggests that scalpel method is better initially for upto 15 day but for a long term period rotary abrasive period proved to be better. Wound healing index shows that scalpel method has a better wound healing than rotary abrasive method.

## **CONCLUSION**

Choice of the technique should be dependent on individual preference, clinical expertise and patient affordability. Although, all techniques have their specific advantages and disadvantages, in this study it was revealed that, in long run scalpel method is better than the rotary abrasive method.

Hence, more data is required for comparative techniques to ensure the long-term predictability and success.

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