



# Evaluation Of Wound Healing Following Operculectomy Using Scalpel with Adjunctive Application of Chlorhexidine and Placentrex Gel

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## ABSTRACT

**Background:** Operculectomy, commonly performed for the management of pericoronitis, is often associated with postoperative pain, inflammation, delayed soft-tissue healing, and risk of secondary infection. Postoperative wound healing potentially influenced by the use of topical adjuncts. **Aim:** This study is to evaluate and compare wound healing following operculectomy using scalpel with the topical application of chlorhexidine gel and Placentrex gel. **Materials and Methods:** This study included 15 patients with pericoronitis undergoing operculectomy. The subjects were divided into three groups (n = 5 each): Group I – standard postoperative care; Group II – topical Placentrex gel; and Group III – topical 0.2% chlorhexidine gel. Clinical assessment was carried out at baseline, and on the 7th and 14th postoperative days using the Visual Analog Scale (VAS), healing index, and clinical evaluation of keratinization. The data were analysed using one-way ANOVA with post-hoc analysis. **Results:** Both chlorhexidine and Placentrex groups demonstrated significantly better wound healing compared to the control group. Baseline PI and VAS scores showed no significant intergroup differences (PI: p = 0.4013; VAS: p = 0.5158). Significant differences were observed on Day 7 for PI, WHI, and postoperative pain (p < 0.01), and on Day 14 for PI and WHI (p < 0.05). **Conclusion:** Placentrex gel showed superior efficacy in accelerating wound healing and reducing postoperative pain following operculectomy, whereas chlorhexidine gel was more effective in plaque control.

**KEYWORDS:** chlorhexidine gel, operculectomy, placentrex gel, wound healing

## I. INTRODUCTION

Operculectomy is a commonly performed minor oral surgical procedure indicated for the management of pericoronitis associated with partially or completely erupted mandibular third molars<sup>[16,19]</sup> which removes the etiological soft tissue component, resulting in an open surgical wound that heals by secondary intention. Healing by secondary intention is a complex, tightly regulated biological process involving the sequential phases of haemostasis, inflammation, proliferation and maturation. Disruption of these cellular and molecular events particularly in the presence of excessive inflammation or microbial contamination can delay healing and compromise tissue integrity. Operculectomy wounds serve as a unique and clinically relevant model for evaluating wound-healing agents, as they are located in an anatomical and biological region characterized by thin mucosa, limited keratinization, continuous functional movement and high microbial exposure due to their posterior intraoral location.<sup>[19,20]</sup> These factors increase the risk of delayed healing and postoperative complications, making effective wound management particularly critical.

Adjunctive application of topical medicaments has been advocated to enhance postoperative healing following periodontal surgical procedures. Chlorhexidine gel, owing to its broad-spectrum antimicrobial activity and substantivity, is widely used to reduce plaque accumulation and gingival inflammation during the early healing period when mechanical plaque control may be compromised.<sup>[23]</sup> In contrast, placentrex gel have been reported to possess anti-inflammatory, angiogenic, and bio-stimulatory properties that enhance fibroblast proliferation and epithelial regeneration,<sup>[23]</sup> thereby promoting faster and more favourable soft tissue healing.<sup>[24]</sup>



Although both chlorhexidine gel and placentrex gel have been individually evaluated for their role in periodontal wound healing, comparative clinical evidence regarding their influence on healing following pericoronal flap excision is limited. Therefore, the present study was designed to evaluate healing following pericoronal flap excision performed using a scalpel with adjunctive application of chlorhexidine gel and placental gel with the aim of assessing their effectiveness in enhancing postoperative soft tissue healing.<sup>[21,23]</sup>

## II. MATERIALS AND METHODS

### Study design:

This was a comparative, randomized, single-blinded, clinical study conducted in the Department of Periodontics, College of Dental Sciences, Davangere, Karnataka, over a study period of 3 months. Patients having diagnosed pericoronitis requiring pericoronal flap excision, at age of 18-40yrs of both genders, healthy individual were included with good oral hygiene practices. Ethical clearance was obtained from the Institutional Ethics Committee. Written consent was obtained from all the patients before starting the study.

### Sample selection

15 systemically healthy patients were included and divided into three (3) groups with 5 in each group.

Group I (Control group)- pericoronal flap excision without topical agent

Group II (Placentrex group)- pericoronal flap excision with placentrex gel application

Group III (Chlorhexidine group)- pericoronal flap excision with 0.2% chlorhexidine gel application

Exclusion criteria were patients with systemic conditions known to affect wound healing (e.g., diabetes mellitus, immunodeficiency), smokers or users of smokeless tobacco, pregnant or lactating women, patients with known hypersensitivity to chlorhexidine or placental extract, recent use of antibiotics, corticosteroids, immunosuppressive or anti-inflammatory drugs, presence of acute pericoronal abscess requiring systemic antibiotics, poor oral hygiene after initial therapy and patients unwilling to comply with follow-up visits.

Clinical evaluation was carried out at baseline for plaque index, on 7<sup>th</sup> day and 14<sup>th</sup> day, postoperatively assessed for pain, discomfort with Visual Analogue Scale (VAS) and wound healing using Wound Healing Index (Landry et al, 1988).

The surgical procedure was performed under local anaesthesia; using the instruments shown in (figure-1). A sterile scalpel blade was used for pericoronal flap excision and homeostasis was achieved. Topical agents shown in (figure 2&3) were applied immediately after the procedure for patients in Group III with Chlorhexidine gel (0.2%) and in Group II with Placentrex gel to surgical site to promote healing and tissue regeneration as shown in (figure 5& 4) respectively. Patients were advised routine care and oral hygiene maintenance for the control, along with the topical application of placentrex gel and chlorhexidine gel twice a day for 10 days for the respective groups.

Clinical evaluation, healing was assessed clinically at baseline, first week (7<sup>th</sup> day) and second week (14<sup>th</sup> day) as shown in (figure 6). Parameters evaluated included, tissue colour and contour, presence of inflammation or edema, bleeding on probing, patient reported discomfort.



**Figure 1- Armamentarium**



**Figure 2-Placentrex gel**



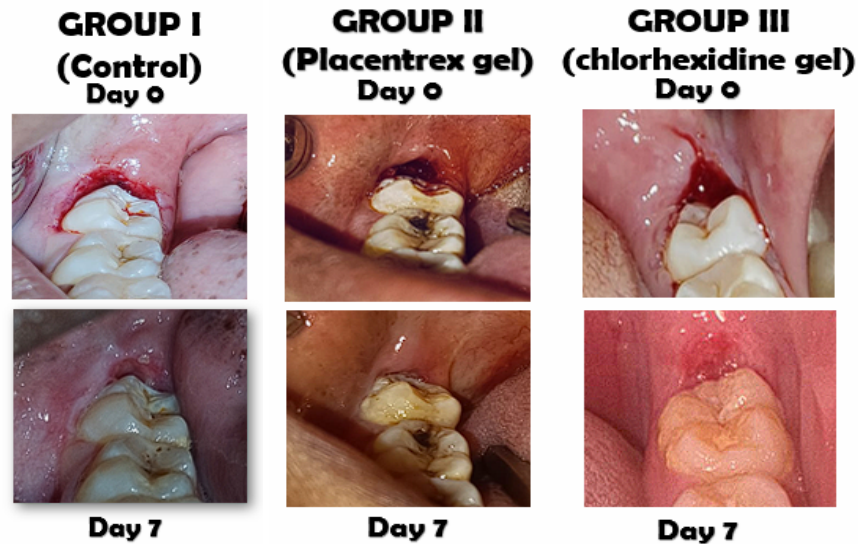
**Figure 3-Chlorhexidine gel**



**Figure 4-Application of placentrex gel**



**Figure 5- Application of chlorhexidine gel**



**Figure 6-** Showing wound healing following operculectomy at Baseline and day 7 between the groups

#### IV. RESULTS AND STATISTICAL ANALYSIS

The results of all groups in relation to Plaque Index, Visual Analogue Scale (VAS) and Wound Healing Index (WHI) has been shown in the (table1-3).

All quantitative variables were expressed as mean  $\pm$  standard deviation. Intergroup comparisons at each time interval were performed using one-way analysis of variance (ANOVA). When a statistically significant difference was detected, post hoc multiple comparison tests were applied to identify pairwise differences. A  $p$ -value  $< 0.05$  was considered statistically significant.

##### Plaque Index (PI)

At baseline, mean PI scores were comparable among all three groups, with no statistically significant intergroup difference ( $p = 0.4013$ ), confirming baseline homogeneity (Table 1).

By Day 7, one-way ANOVA revealed a statistically significant intergroup difference in PI scores ( $p = 0.0073$ ). Post hoc analysis showed significantly lower PI scores in both the Placentrex ( $0.45 \pm 0.06$ )

#### III.

and chlorhexidine groups ( $0.44 \pm 0.06$ ) compared to the control group ( $0.63 \pm 0.09$ ) (Table 1).

At Day 14, PI scores further decreased in all groups, with a statistically significant intergroup difference ( $p = 0.0020$ ). The chlorhexidine group demonstrated the lowest PI score ( $0.39 \pm 0.02$ ), followed by the Placentrex group ( $0.45 \pm 0.07$ ), both of which were significantly lower than the control group ( $0.59 \pm 0.09$ ) (Table 1).

##### Postoperative Pain (VAS)

Baseline VAS scores showed no statistically significant intergroup difference ( $p = 0.5158$ ), indicating comparable preoperative pain levels (Table 2).

At 24 hours postoperatively, a high statistically significant intergroup difference was observed ( $p = 0.0004$ ). Post hoc analysis revealed significantly lower pain scores in the Placentrex group ( $3.20 \pm 0.83$ ) compared to both chlorhexidine group ( $4.80 \pm 0.83$ ) and control group ( $5.80 \pm 0.44$ ). The chlorhexidine group showed significantly lower pain scores than the control group (Table 2).



At 72 hours, pain reduction was evident, with a highly significant intergroup difference ( $p = 0.0001$ ). The Placentrex group exhibited the greatest pain relief ( $0.60 \pm 0.89$ ), followed by the chlorhexidine group ( $2.80 \pm 0.83$ ), while the control group reported higher residual pain ( $3.60 \pm 0.54$ ). Post hoc comparisons confirmed statistically significant differences among all three groups (Table 2).

### Wound Healing Index (WHI)

At Day 7, the Placentrex group demonstrated the highest WHI score ( $4.20 \pm 0.44$ ), indicating superior early wound healing, followed by the chlorhexidine group ( $3.00 \pm 0.70$ ). The control group showed significantly delayed healing with a mean WHI score of  $2.40 \pm 0.54$  (Table 3).

By Day 14, WHI scores improved across all groups, with a statistically significant intergroup difference ( $p = 0.0467$ ). Both the Placentrex and chlorhexidine groups achieved higher and comparable WHI scores ( $4.60 \pm 0.54$ ), whereas the control group demonstrated relatively lower healing scores ( $3.80 \pm 0.44$ ) (Table 3).

PLAQUE INDEX	GROUPS	MEAN $\pm$ SD	P-VALUE
BASELINE	Group I (Control)	$0.54 \pm 0.10$	0.4013
	Group II (Placentrex gel)	$0.48 \pm 0.10$	
	Group III (Chlorhexidine gel)	$0.46 \pm 0.04$	
DAY 7	Group I (Control)	$0.63 \pm 0.09$	0.0073
	Group II (Placentrex gel)	$0.45 \pm 0.06$	
	Group III (Chlorhexidine gel)	$0.44 \pm 0.06$	
DAY 14	Group I (Control)	$0.59 \pm 0.09$	0.0020
	Group II (Placentrex gel)	$0.45 \pm 0.07$	
	Group III (Chlorhexidine gel)	$0.39 \pm 0.02$	

**Table 1:** Comparison of Plaque Index among Group I, Group II and Group III following Operculectomy

VAS	GROUPS	MEAN $\pm$ SD	P-VALUE
BASELINE	Group I (Control)	$5.80 \pm 0.83$	0.5158
	Group II (Placentrex gel)	$6.00 \pm 0.70$	

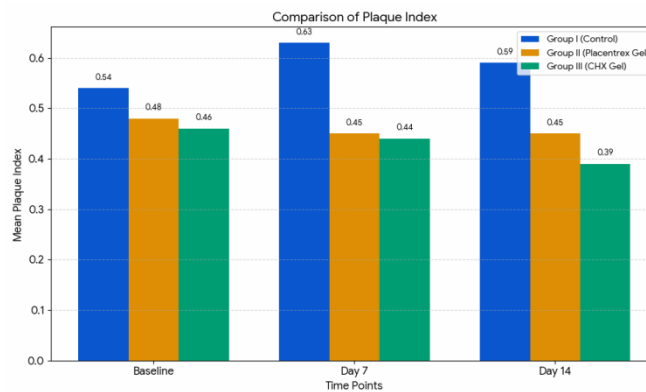


	Group III (Chlorhexidine gel)	5.40 ± 0.89	
24hrs	Group I (Control)	5.80 ± 0.44	0.0004
	Group II (Placentrex gel)	3.20 ± 0.83	
	Group III (Chlorhexidine gel)	4.80 ± 0.83	
72 hrs	Group I (Control)	3.60 ± 0.54	0.0001
	Group II (Placentrex gel)	0.60 ± 0.89	
	Group III (Chlorhexidine gel)	2.80 ± 0.83	

**Table 2:** Comparison of Visual analogue scale (VAS) among Group I, Group II and Group III following Operculectomy

WOUND HEALING INDEX (WHI)	GROUPS	MEAN ± SD	P-VALUE
DAY 7	Group I (Control)	2.40 ± 0.54	0.0011
	Group II (Placentrex gel)	4.20 ± 0.44	
	Group III (Chlorhexidine gel)	3.00 ± 0.70	
DAY 14	Group I (Control)	3.80 ± 0.44	0.0467
	Group II (Placentrex gel)	4.60 ± 0.54	
	Group III (Chlorhexidine gel)	4.60 ± 0.54	

**Table 3:** Comparison of Wound healing index (WHI) among Group I, Group II, and Group III following Operculectomy



**Figure 7-** comparison of plaque index between all 3 groups

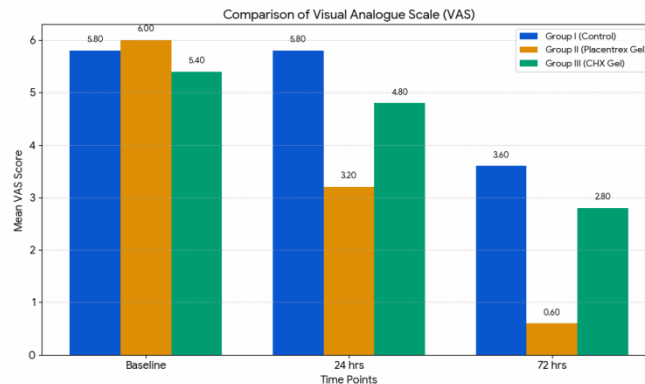


Figure 8- comparison of VAS between all 3 groups

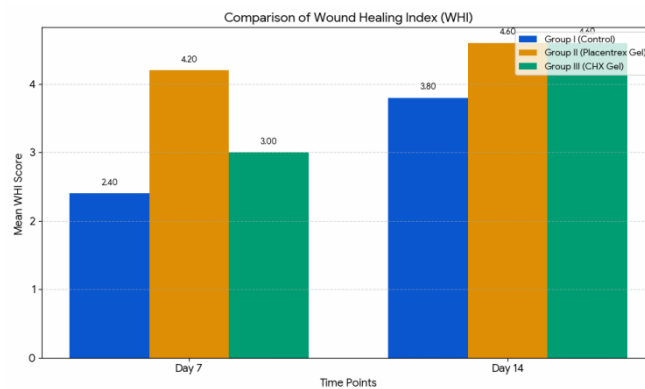


Figure 9- comparison of wound healing index between all 3 groups

## V. DISCUSSION

The present study evaluated the efficacy of Placentrex gel and chlorhexidine gel as adjuncts to standard postoperative care following operculectomy, with respect to plaque control, postoperative pain and wound healing. Placentrex and chlorhexidine gels demonstrated significantly better plaque control than standard (control group) postoperative care at Days 7 and 14. The superior plaque control observed with chlorhexidine gel at Day 7 can be attributed to its well-documented antimicrobial substantivity and broad-spectrum antibacterial activity, which inhibits plaque formation during the healing phase, as reported by Løe and Schiott [25] and Jones [26]. Previous studies have reported chlorhexidine as an effective adjunct for plaque control following periodontal and minor oral surgical procedures [25, 26].

Placentrex gel demonstrated plaque reduction comparable to chlorhexidine gel at Day 7, it showed slightly higher Plaque Index scores at Day 14, it may be explained due to the absence of

sustained antimicrobial substantivity and also Placentrex gel primarily exerts its therapeutic effect by enhancing tissue repair and regeneration rather than directly inhibiting microbial colonization, as given by Gupta and Kumar [27].

Placentrex gel group demonstrated significantly lower pain scores postoperatively to that of chlorhexidine and control groups at 24 and 72 hours which is attributed to the anti-inflammatory, angiogenic and biogenic stimulant properties of placental extracts, which promote rapid tissue repair and reduce inflammatory mediator release, as demonstrated by Sur et al. [28], Singh et al. [29], and Pal and Roy [30] and these findings are consistent with previous reports that have shown placental extract-based formulations to be effective in reducing postoperative pain and inflammation following oral surgical procedures, as reported by Jain et al. [31].

Placentrex gel is known to enhance fibroblast proliferation, collagen synthesis, neo-vascularization, and epithelial regeneration, thereby



accelerating the wound healing process. In this study Wound Healing Index revealed significantly better and early wound healing and complete keratinization with the Placentrex gel group at Day 7 than chlorhexidine group and the control group demonstrated delayed healing. [29,30]. Chlorhexidine gel also showed improved wound healing compared to the control group, possibly due to its ability to reduce microbial load at the surgical site and minimize secondary infection and inflammation, as reported by Sharma and Pradeep [6]. On day 14 both Placentrex and chlorhexidine groups achieved significantly higher and comparable Wound Healing Index scores than the control group, which suggests natural healing occurs over time, the use of adjunctive topical agents can accelerate the healing process and improve early clinical outcomes following operculectomy.

The findings of the present study highlight the clinical relevance of using adjunctive topical agents following operculectomy to enhance patient comfort and surgical site wound healing. Placentrex gel may be particularly advantageous in the immediate postoperative period due to its superior analgesic and wound healing properties, whereas chlorhexidine gel remains a reliable option for long term plaque control. Our study has some limitations which are, the sample size was relatively limited, and the follow up period was short. Microbiological and histological assessments were not performed which could have provided further insight into the mechanisms underlying the observed clinical effects. Future studies with larger sample sizes, longer follow up periods, inclusion of microbiological and histological assessments, patient reported outcome measures are recommended to validate and expand upon these findings.

## VI. CONCLUSION

Placentrex gel demonstrated superior efficacy in reducing postoperative pain and accelerated wound healing during the early postoperative period, while chlorhexidine gel showed better plaque control. We conclude that the use of biologically active regenerative agents either alone or in combination with antimicrobial measures may enhance postoperative outcomes and patient comfort following operculectomy. Further well-designed clinical trials with larger sample sizes and longer follow-up are required to substantiate these results.

## REFERENCES:

- [1]. Al Ashmawy R, Elkashty A, El Shennawi M. Clinical evaluation of gingival healing following gingivectomy with application of human placental extracts (Placentrex gel). *Mans J Dent.* 2023;10(3):241–248.
- [2]. Amaliya A, Ramadhanti R, Hadikrishna I, Maulina T. The effectiveness of 0.2% chlorhexidine gel on early wound healing after tooth extraction: a randomized controlled trial. *Eur J Dent.* 2022;16(3):688–694.
- [3]. Bakaéén GS, Strahan JD. Effects of a 1% chlorhexidine gel during the healing phase after inverse bevel mucogingival flap surgery. *J Clin Periodontol.* 1980;7(1):20–25.
- [4]. Sharma A, Kaushik M, Rana N, Singh S. Placentrex gel used as a surgical wound healing agent: a case report. *Int J Appl Dent Sci.* 2021;7(2):366–369.
- [5]. Sripathi Rao et al. Comparison of healing after operculectomy performed with a surgical knife versus an 810-nm diode laser in patients with pericoronitis. 2016.
- [6]. Addy M, Moran J. Clinical indications for the use of chemical adjuncts to plaque control: chlorhexidine formulations. *Periodontol* 2000. 1997; 15:52–54.
- [7]. Jenkins S, Addy M, Wade W. The mechanism of action of chlorhexidine: a review of the literature. *J Clin Periodontol.* 1988;15(7):415–424.
- [8]. Mathur A, Jain A, Kothari S, et al. Evaluation of placental extract gel in the management of oral ulcers and mucosal healing. *J Indian Dent Assoc.* 2019;13(4):21–25.
- [9]. Shetty S, Bhat G, Bansal R. Effectiveness of 0.2% chlorhexidine gel as a postoperative aid in periodontal flap surgery: a randomized controlled trial. *J Periodontol.* 2014;85(9):1186–1193.
- [10]. Paul B, Deka AC, Saikia H. Role of placental extract in wound healing: a clinical study. *Int J Surg Sci.* 2018;2(1):22–25.
- [11]. Quirynen M, Avontroodt P, Peeters W, et al. Effect of different chlorhexidine formulations in mouthrinses on plaque accumulation and gingival inflammation. *J Periodontol.* 2001;72(3):274–282.
- [12]. Rajendran R, Paul R, Mohanty S. Comparative evaluation of placental extract and aloe vera gel in oral wound healing: a clinical study. *J Pharm Bioallied Sci.* 2020;12(Suppl 1): S501–S506.
- [13]. Zanatta FB, Antoniazzi RP, Rösing CK. Staining and calculus formation after 0.12%



- chlorhexidine rinses in plaque-free and plaque-covered surfaces: a randomized trial. *J Appl Oral Sci.* 2010;18(5):515–521.
- [14]. Gupta N, Gupta ND, Gupta A. Role of placentrex gel in enhancing healing after periodontal surgery: a split-mouth clinical study. *J Periodont Res.* 2017;52(4):632–638.
- [15]. Teles RP, Teles FR. Antimicrobial agents in the management of periodontal diseases. *Braz Oral Res.* 2009;23(Suppl 1):28–34.
- [16]. Singh V, Yadav R, Sharma S. Evaluation of healing following operculectomy in pericoronitis patients: a clinical study. *J Oral Maxillofac Surg Med Pathol.* 2019;31(3):200–205.
- [17]. Kumar P, Singh A. Comparison of healing outcomes following diode laser versus scalpel operculectomy: a randomized controlled trial. *Lasers Med Sci.* 2018;33(8):1765–1771.
- [18]. Chandra S, Reddy M, Babu N. Healing outcomes of operculectomy performed using electrocautery: a prospective clinical analysis. *J Clin Diagn Res.* 2017;11(5):ZC56–ZC59.
- [19]. Ahmed S, Hassan R, Khan M. Soft tissue healing after operculectomy: correlation with patient symptoms and plaque control. *Int J Dent Med Res.* 2016;2(6):20–24.
- [20]. Verma R, Lamba AK, Faraz F. Early healing response after operculectomy with scalpel vs CO laser: a clinical comparative evaluation. *J Lasers Med Sci.* 2020;11(2):174–179.
- [21]. Newman MG, Takei H, Klokkevold PR. Wound healing in periodontal therapy. *J Periodontol.* 2002;73:138–146.
- [22]. Waite DE. Management of pericoronitis. *Oral Surg Oral Pathol.* 1976;41(6):759–766
- [23]. Sharma A, Pradeep AR. Effect of chlorhexidine on wound healing following periodontal surgery. *J Indian Soc Periodontol.* 2012;16(2)223v-228
- [24]. Bansal P, Gupta R. Role of placental extract in oral wound healing. *J Oral Maxillofac Surg.* 2014;72:125–130.
- [25]. Loe H, Schiott CR. The effect of mouthrinses and topical application of chlorhexidine on the development of dental plaque and gingivitis in man. *J Periodontal Res.* 1970;5(2):79-83.
- [26]. Jones CG. Chlorhexidine: is it still the gold standard? *Periodontol 2000.* 1997;15:55-62
- [27]. Gupta A, Kumar P. Assessment of the efficacy of placental extract in wound healing. *Int Surg.* 2003;88(4):236-239.
- [28]. Sur TK, Biswas TK, Ali L, Mukherjee B. Anti-inflammatory and anti-platelet aggregation activity of human placental extract. *Phytother Res.* 2003;17(7):786-790.
- [29]. Singh PK, Prakash J, Patel A. Evaluation of placental extract in the management of chronic wounds. *J Wound Care.* 2004;13(2):79-81.
- [30]. Pal P, Roy A. Role of placental extract in enhancement of wound healing. *Indian J Dermatol.* 2006;51(3):189-191.
- [31]. Jain A, Gupta A, Bansal A. Clinical evaluation of placental extract in post-operative oral wounds. *J Oral Maxillofac Surg.* 2010;68(6):1362-1366.