EFFECT OF INTRA-POCKET ANAESTHESIA DURING SCALING AND ROOT PLANING IN PATIENTS WITH PERIODONTITIS: A COMPARITIVE, INTERVENTIONAL STUDY

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ABSTRACT

Background: The pathogenesis of periodontal disease is a complex process involving interactions among microbial species, host immune response, and environmental factors which results in tissue inflammation and bone destruction. Non surgical therapy, scaling and root planning (SRP) is the most common procedure used to treat gingivitis and periodontitis. Scaling

and root planning involves mechanical removal of plaque, calculus (mineralized plaque/tartar); and necrotic cementum respectively, by hand or ultrasonic instruments.

Objectives: To evaluate the effect of topical anesthetic EMLA & benzocaine applied intrasulcularly in reducing the pain during scaling and root planning (SRP).

Material and Methods: An interventional study was conducted on sixty participants with moderate to severe periodontitis. Participants with periodontitis were examined intraorally for assessment of pocket depth and clinical attachment loss. Participants were randomly allotted to three groups of twenty participants in each group, Group 1- EMLA group (n=20), Group 2 - 20% benzocaine gel (n=20), and Group 3- Control group [placebo] (n=20). Anesthetics were left in the pocket for 2 min, whereupon subgingival scaling and root planning was performed. Pain was measured using the Visual Analogue Scale (VAS) and Verbal Rating Scale (VRS). Pain was assessed during the treatment i.e approximately midway through treatment (intra-operative) and immediately after treatment (post-operative).

Results: The mean VAS intra score for EMLA, 20% Benzocaine and placebo were 44.30 ± 11.53, 47.50 ± 8.88 and 54.85 ± 12.84 respectively. The mean VAS post score for EMLA, 20% Benzocaine and placebo were 10.40 ± 6.17, 14.80 ± 7.50 and 16.50 ± 6.71 respectively. The mean VS score for EMLA, 20% Benzocaine and placebo were 1.50 ± 0.72, 1.80 ± 0.67 and 2.20 ± 0.77 respectively. Significantly lower VAS post and VS scores were found in EMLA group in comparison to 20% Benzocaine and placebo group.

Conclusion: Topical anaesthetic gel provided excellent pain control for patients undergoing non surgical periodontal therapy. The anesthetic gel EMLA (25 mg/lidocaine plus 25 mg/g prilocaine) provided a statistically significant reduction in pain on SRP in patients with untreated

periodontitis. It suggested that the gel may be alternative with patients who associate SRP to be painful and avoid dental treatment.

Keywords: Anaesthesia, Intra-pocket, EMLA, Benzocaine, Root planing

INTRODUCTION:

Periodontal disease, including gingivitis and periodontitis, is a dental plaque induced infection which can lead to tooth mortality due to loss of tooth supporting structures, i.e. the periodontium.[1] Periodontal disease is a complex process involving interactions among microbial species, host immune response and environmental factors which results in tissue inflammation and bone destruction. Bacteria are considered to be the first etiological factor to cause periodontal disease. Pocket formation and loss of attachment are clinical consequence of periodontal disease. To eliminate and prevent further tissue destruction, periodontal pockets need repeated subgingival mechanical debridement and cleansing.

Mechanical scaling and root planning (SRP) are gold standard treatment plan for periodontitis, which form integral components of the periodontal treatment plan. SRP carried out efficiently reduces pocket depth, bleeding on probing, gingival inflammation, and stabilize attachment levels. Scaling is associated with discomfort and pain; subgingival scaling and root planing appear to be more painful than supragingival scaling. [2,3]

During scaling and root planning, pain occurs due to the excitation of the free nerve endings present within the gingiva which get traumatized during instrumentation. [1] Pain control is considered to be an important outcome measure for successful periodontal therapy. Adequate pain control may be extremely important in gaining patient compliance for further

maintenance therapy.[4] Injectable local anesthesia is considered the simplest and most effective method in reducing pain during dental procedure.

However, it is ironic that needle injection of local anesthetic which is the commonest modality of pain control, itself is a source of fear and anxiety for the patients. Topical anesthetic agents have proven to be a boon in their attempts to painless dentistry. [5] When an injectable anesthetic is taken into account the gold standard in such cases is that it should or should not be utilized in conjunction with a local anesthetic. It has recently been demonstrated that the utilization of a local anesthetic doesn't compromise subgingival treatment and offers similar benefits to pocket probing and clinical attachment gain to an injectable anesthetic. [6]

Pain control constitutes an important aspect of dental treatment. Benzocaine is chemically classified as an amino ester and is available in both solution and gel form. It is one of the most commercially available local anesthetic drugs used in dentistry. This drug has a rapid onset of action, limited potency and short anesthetic duration, besides being exclusively utilized in mucous membranes. EMLA is an anesthetic formulation defined as an eutectic mixture of local anesthetic drugs composed of a combination of 2.5% prilocaine and 2.5% lidocaine. This formulation is indicated for pain control in several superficial cutaneous procedures.[7,8] Thus, the aim of the present study was to compare the effects of eutectic mixture containing 25 mg/g of lidocaine and 25 mg/g of prilocaine, topical 20% benzocaine and a placebo substance on reducing pain during subgingival scaling and root planning.

MATERIAL & METHODS:

An interventional study was carried out on participants attending the OPD (Outpatient Department) at the Department of Public Health Dentistry, K.D. Dental College and Hospital,

Mathura to evaluate the effectiveness of two intrapocket anesthetic gels in reducing pain during scaling and root planning. Before starting the study, Ethical clearance was obtained from the Institutional Review Board. An informed consent was obtained from each participant during this study. This study was conducted over a period of 3 months; i.e. November 2021 to January 2022.

INCLUSION CRITERIA:

- Age - 18 to 60 years.
- Systemically healthy patients.
- Had no missing posterior teeth (2^{nd} premolar, 1^{st} molar & 2^{nd} molar).
- One quadrant containing minimum of 5 natural teeth with two or more pockets of depth $\geq$ 5mm.
- Capacity to understand Visual Analogue Scale (VAS) to assess pain.
- Moderate to severe periodontitis

EXCLUSION CRITERIA

- Patients suffering from any psychiatric disorder.
- Patients requiring prophylactic antibiotics.
- Patients who were taking NSAIDS for any disease
- History of allergy, or any form of reaction to local anesthetics.
- Pregnant or lactating women.
- Patients with heart, kidney or liver disease.
- Patients who had an acute periodontal pain, pulpitis, abscess, ulcerative lesion in oral cavity, other acute infections, patient requiring extraction in study quadrant, pathology in

oral cavity requiring immediate treatment, and patients with dental implant in study quadrant.

Based on the inclusion and exclusion criteria 60 participants were selected for the study. The selected participants were randomly allotted to three groups of twenty participants in each group. The participants in the three groups were distributed as:

Group 1 - EMLA (n=20)

Group 2 - 20% Benzocaine gel (n=20), and

Group 3- Placebo (Control group) (n=20).

Participants were individually instructed about the Visual Analogue Scale (VAS) and Verbal rating scale for pain. Pain was assessed during the treatment i.e. approximately midway through treatment (intra-operatively) and immediately after treatment (post-operatively). The study was performed by two different operators, one operator who administered the anesthetics & recorded the VAS & VS score, and the second one who performed subgingival scaling and root planning and assessed main outcome.

The deepest level of attachment from the cemento enamel junction (CEJ) to the base of pocket was recorded; the deepest probing depth was recorded using a periodontal probe (CPITN) and the analysis was done based on the average of the above recordings. The duration of the procedure on the selected teeth was also recorded.

PROCEDURE:

Patients were seated and in the dental chair and prepared for SRP. Prior to administration of anesthesia, relative isolation was performed with cotton rolls. When anesthesia was

administered the patient was masked to the type of anesthesia. All the anesthetics were administered by same operator. A different operator performed the subgingival scaling and root planning (SRP) and assessed the main outcome. The operator who performed the subgingival scaling and root planning was blinded to the type of anesthesia administered, and same procedure was performed similarly in all groups.

The anesthetic was applied directly into pocket of each tooth with the blunt tip applicator, starting at the most posterior tooth of selected quadrant and continuing anteriorly to the next available tooth. Anesthetic was left in the periodontal pocket of each tooth for 2 minutes, whereupon SRP commenced. Two minutes after administration of anesthetics, the operator began the SRP procedure using hand instruments (curettes and sickles). The maximum dose of topical anesthetics used in sextant was not more than 2.5 ml.

For each tooth, patient was asked to indicate the intensity of pain experience during the treatment with the aid of a Visual Analogue Scale, five minutes after the onset of the procedure i.e. midway during procedure (intra-operatively) and immediately after the completion of the treatment. After all teeth in the selected sextant had received subgingival scaling and root planning (SRP) and VAS pain score had been assessed, the patient was asked to rate overall pain on five-point Verbal Rating Scale (VRS) (No pain, slight pain, medium pain, severe pain or very severe pain)in response to the question, "How much pain did you feel during the subgingival scaling and root planning (SRP) procedure?".

Both the scales were scored in the absence of the operator that had performed subgingival SRP. Subgingival SRP was performed until root surfaces achieved adequate smoothness. If there was an interruption due to pain, the gel was reapplied directly into the pocket of same tooth and

the scaling and root planning resumed maximum of 2 min. If SRP after reapplication was not interrupted due to pain, the procedure was continued in a sequential fashion.

However, if SRP was still painful, no further application of the gel was allowed & experiment was aborted for that patient. Aborted patients were prescribed analgesic medication for pain relief. All the patients were asked to report if they noticed any possible adverse events, such as any irritation, stinging pain, soreness, swelling, loss of feeling, alteration of taste, nausea, fatigue 24 – 48h post-treatment. Collected data was entered in the Microsoft excel sheet and analysed using statistical package of social sciences (SPSS) version 20. Different anesthetic modalities groups was statistically analysed using one way analysis of variance (ANOVA), Kruskal wallis test and Post hoc test & Pearson Chi-square. In addition, the significance level was set at ≤ 0.05.

RESULT:

A total of 60 eligible individuals were recruited in this study. Among the 60 study participants, 66.7% (40) were males and 33.3% (20) were females. The mean age for the study subjects was **34.8 ± 2.658** years. The distribution of the study participants in the three groups, according to gender has been described in **Table 1**.

Table 1: Distribution of study participants according to gender

Gender	**Group**			**Total**
	EMLA	**20% Benzocaine**	**Placebo**	
Male	13	12	15	40
Female	7	8	5	20
Total	20	20	20	60

In the current study the average PD and CAL value for EMLA group were reported as 5.70 ± 0.66 and 6.30 ± 0.57 respectively, for 20% benzocaine group was 5.65 ± 0.67 and 6.20 ± 0.523 respectively, and for placebo group were 5.90 ± 0.89 and 6.30 ± 0.73 respectively. The average time required for scaling and root planning of two teeth was approximately 42 min. However no statistically significant differences were found among the three groups for these variables. **(Table 2)**

Table 2: Probing depth, CAL and OT for different anesthetic modalities groups using the ANOVA test

Anesthetic modality	**PD (Mean ± S.D.)**	**CAL (Mean ± S.D.)**	**OT (Mean ± S.D.)**
EMLA	5.70 ± 0.66	6.30 ± 0.57	42.70 ± 6.85
20% Benzocaine	5.65 ± 0.67	6.20 ± 0.523	42.20 ± 6.00
Placebo	5.95 ± 0.89	6.30 ± 0.73	42.00 ± 7.35
p value	0.40	0.84	0.95

P ≤ 0.05 *Significant

In the current study, the mean VAS intra score for EMLA, 20% Benzocaine and placebo were reported as 44.30 ± 11.53, 47.50 ± 8.88 and 54.85 ± 12.84 respectively. Regarding VAS intra, a significantly lower score was found with the EMLA group in comparison to the 20% Benzocaine and placebo group. The mean VAS post score for EMLA, 20% Benzocaine and placebo were 10.40 ± 6.17, 14.80 ± 7.50 and 16.50 ± 6.71 respectively. The mean VS score for EMLA, 20% Benzocaine and placebo were found to be 1.50 ± 0.72, 1.80 ± 0.67 and 2.20 ± 0.77 respectively. A **significantly lower VAS post and VS scores** were found in EMLA group in comparison to 20% Benzocaine and placebo group. **(Table 3)**

Table 3: VAS intra, VAS post operative and VS for different anesthetic modalities groups using the Kruskal Wallis Test

Anesthetic modality	VAS intra operative (Mean ± SD)	VAS post operative (Mean ± SD)	VS (Mean ± SD)
EMLA	44.30 ±11.53	10.40 ± 6.17	1.50 ± 0.72
20% Benzocaine	47.50 ± 8.88	14.80 ± 7.50	1.80 ± 0.67
Placebo	54.85 ± 12.84	16.50 ± 6.71	2.20 ± 0.77
p value	**0.01***	**0.011***	**0.010***

P ≤ 0.05 *Significant

Post hoc analysis was carried out between the intra-operative and post-operative VAS for the different anesthetic modalities. During the intra-operative & post- operative period when EMLA was compared with 20% benzocaine & placebo, the results were found to be statistically significant ($p \leq 0.05$). Similarly, when a comparison was made between 20% benzocaine and placebo for anesthetic effect during intra & post-operative period, the results were found to be statistically significant ($p \leq 0.05$). **(Tables 4 and 5)**

Table 4: Post hoc analysis in intra-operative VAS for the different anesthetic modalities

Anesthetic group	Mean Difference	Std. Error	p value	95% Confidence Interval	
				Lower Bound	Upper Bound
EMLA- 20% Benzocaine	-3.200	3.543	.000*	-11.94	5.54
EMLA- Placebo	-10.550*	3.543	.013*	-19.29	-1.81
20% Benzocaine- Placebo	-7.350	3.543	.010*	-16.09	1.39

P ≤ 0.05 *Significant

Table 5: Post hoc analysis in post- operative VAS with different anesthetic modalities

Anesthetic groups	**Test statistic**	**Standard error**	**Std. Test statistic**	**Mean diff**	**p value**
EMLA-PLACEBO	-16.26	5.48	-2.97	- 6.10	0.003*
EMLA-20% BENZOCAINE	-9.85	5.41	-1.82	- 4.40	0.006*
20% BENZOCAINE-PLACEBO	-6.40	5.48	-1.17	- 1.70	0.001*

P ≤ 0.05 *Significant

Paired t test was used to compare the intra-operative and post-operative VAS scores in EMLA, 20% Benzocaine and placebo group. When the comparison was done between intra-operative and post-operative VAS score in patients with the different anesthetic modalities, a **significant difference** was noted in all three groups (p = 0.000). Pain was reported to have reduced significantly in all the three groups with the different anesthetic modalities. **(Table 6)**

Table 6: Comparison of intra operative and postoperative VAS scores in patients treated with different anesthetic modalities using Paired Samples t Test

	Paired Differences					**T**	**Df**	**Sig. (2-tailed)**
	Mean	**Std. Deviation**	**Std. Error Mean**	**95% Confidence Interval of the Difference**				
				Lower	**Upper**			
VAS intra EMLA – VAS post EMLA	33.90000	11.92035	2.66547	28.32110	39.47890	12.718	19	.000*

VAS intra 20% benzocaine – VAS post 20% benzocaine	32.70000	11.03630	2.46779	27.53485	37.86515	13.251	19	.000*
VAS intra placebo – VAS post placebo	38.35000	11.58163	2.58973	32.92963	43.77037	14.808	19	>.05

Pearson Chi square test was carried out to establish an association of reapplication of anesthetic agent with type of anesthetic modalities. However no significant difference was found for the reapplication of the anesthetic agent with the different types of the anesthetic modalities used. **(Table 7)**

Table 7: Association of reapplication of anesthetic agent with type of anesthetic modalities using the Pearson Chi square test

Group	**Reapplication (%)**		**Pearson Chi-Square**	**p value**
	No	**Yes**		
EMLA	16(80%)	4(20%)	1.905	0.386
20% Benzocaine	14(70%)	6(30%)		
Placebo	12(60)	8(40%)		
Total	42	18		

DISCUSSION:

The primary objective of periodontal therapy is to eliminate or control the disease, arrest further periodontal tissue destruction and periodontal pockets require repeated subgingival mechanical debridement.[9] The usual anesthetic techniques used in conjunction with periodontal scaling and root planing (SRP) are nerve block and infiltration anesthesia either alone or in

combination with topical anesthesia. The main drawback of using needle anesthesia, apart from being painful and uncomfortable, is the reduction in compliance with SRP. [10]

A number of studies evaluating topical intrapocket anesthesia have used EMLA, which was developed for periodontal use and has demonstrated satisfactory effectiveness for subgingival SRP. In present study, regarding VAS (Visual Analogue scale) and VS (Verbal scale), a significantly lower score was found with EMLA group in comparison to the 20% Benzocaine and placebo group. Almost similar result was seen in study conducted by **Mayor-Subirana G et al** in which EMLA showed better reduction of pain during SRP, VAS scores (Visual Analogue scale) and VS (Verbal scale) scores wave significantly lower in EMLA group.[11]

In a similar study conducted by **Singh S et al** to assess the efficacy between Benzocaine and EMLA, EMLA was found to be much more effective and the result was reported to be significant. The use of EMLA in the oral cavity was first documented by Holst A and Evers H in 1985. Since then a number of studies have been conducted to investigate its efficacy for lowering the pain of injection, removal of arch bars, excision of gingival tissues, gingival probing, scaling, root planing and other clinical procedures in paediatric dentistry.[12]

In another study conducted by **Antoniazzi RP et al,** different anesthetic modalities, i.e. EMLA, Benzocaine & placebo was compared during intra & post-operative period of SRP using Visual Analogue Scale (VAS) & Verbal Rating Scale (VRS), where the difference was found to be significant. EMLA was seen to be comparatively better than 20% benzocaine gel and placebo with regards to pain reduction during scaling and root planning in patients with periodontitis.

Thus, the results of the present study was found to be in accordance to the study conducted by **Antoniazzi RP et al**. [6]

The experience of pain during dental procedures is a concern to many individuals. Currently, there are limited practical techniques to reduce this pain. Injection anesthesia is an established method, but the unwanted side effects of prolonged anesthesia, anesthesia of adjacent structures (lips and/or tongue), and the psychological trauma of receiving multiple invasive ‘‘injections’’ makes it impractical. Topical anesthetics (jellies, ointments, or sprays) may be preferred because they produce less post procedure numbness. More recently, an intrapocket anesthetic gel, i.e. – EMLA 5% cream and LOX 2% gel, has been evaluated.[13] During the recent years, EMLA has been most widely used anesthetic gel similar to other local anesthetics due to easier control and longer duration in the area.[14]

Patel KR et al conducted a study to evaluate the effect of Eutectic Mixture of Local Anaesthetics (EMLA) on pain perception during Scaling & Root Planing (SRP). The study results showed that the mean Visual Analogue Scale (VAS) when EMLA cream was used was lower compared to when EMLA cream was not used. The mean Verbal Rating Scale (VRS) was also lower when EMLA cream was applied. Similar trend was seen in present study in which Visual Analogue Scale (VAS) & Verbal Rating Scale (VRS) score was lower when EMLA cream.[15]

The aim of modern dentistry is to provide the patient with maximum comfort during any kind of dental sessions. However periodontitis being an inflammatory disease is seldom associated with significant pain. Scaling and root planning (SRP) is a supportive therapy for periodontal diseases causing discomfort or pain. [16] [17] Pain experience during "preventive"

treatments may discourage patients for taking dental treatment. Thus, dental pain management remains one of the most critical aspects of modern dentistry which affects the patient's quality of life. [18] [19]

LIMITATIONS & RECOMMENDATION:

- The sample size was limited. Thus, the results could not be used to generalize the surface anesthetic potential of EMLA or benzocaine.
- It was observed that EMLA had a low viscosity due to which localization of this topical anesthetic to the desired site on the oral mucosa was difficult.
- The result cannot be generalized to the whole population due to small sample size for which further studies are recommended taking larger sample size with wider geographical representation to evaluate the effect of intrasulcularly applied topical anesthetic in reducing the pain during scaling and root planning.

CONCLUSION:

The findings of the present study showed that VAS and VS pain score was relatively low in EMLA group when compared to 20% benzocaine and placebo group. The anesthetic gel EMLA (25 mg/lidocaine plus 25 mg/g prilocaine) provides a statistically significant reduction in pain on SRP in patients with untreated periodontitis. It suggests that the gel may be alternative with patients who associate SRP to be painful and avoid dental treatment. EMLA gel can be seen as a valuable alternative for injected anesthesia during SRP which can reduce the fear and discomfort associated with the same.

REFERENCES:

1. Jacob PS, Nath S. Efficacy of a topical anaesthetic on pain during scaling and root planing: a double blind split mouth pilot study in patients with periodontitis. Sains Malays, 2013; 42(5):685-692.
2. Dayakar MM, Akbar SM. A randomized placebo-controlled trial to evaluate a novel non injectable anesthetic gel with thermosetting agent during scaling and root planing in chronic periodontitis patients. Saudi J Anaesth, 2016; 10(1) :192-197.
3. Varma S, Bhola S, Mohitey J, Redasani R, Gangavati R, Gangavati R. Effectiveness of a novel topical anesthetic gel in patients undergoing non surgical periodontal therapy. Cumhuriyet Dent J, 2013; 16(2): 99-103.
4. Chintala K, Kumar SP, Murthy KR. Comparative evaluation of effectiveness of intra-pocket anesthetic gel and injected local anesthesia during Scaling and Root Planing – A split-mouth clinical trial. Indian J Dent Res, 2017; 28(1): 281-285.
5. Walimbe H, Muchandi S, Bijle MNA, Bendgude V, Deshpande R, Dolas A, Chaturvedi S. Comparative evaluation of the efficacy of topical anesthetics in reducing pain during administration of injectable local anesthesia in children. World J Dent, 2014; 5(2): 129-133.
6. Antoniazzi RP, Cargnelutti B, Daniela Napoleao Freitas, Magali Beck Guimaraes, Fabricio Batistin Zanatta, Carlos Alberto Feldens. Topical intrapocket anesthesia during scaling and root planing: a randomized clinical trial. Braz Dent J, 2015; 26(1): 26-32.
7. Gondim DG, Montagner AM, Pita-Neto IC, Bringel RJ, Sandrini FA, Moreno EF et al. Comparative analysis of the effectiveness of the topical administration of benzocaine and EMLA on oral pain and tactile sensitivity. Int J Dent, 2018; 1(1): 1-5.

8. Svensson P, Petersen JK, Svenssont H. Efficacy of a topical anesthetic on pain and unpleasantness during scaling of gingival pockets. Anesth Prog, 1994: 41(1): 35-39.
9. Donaldson D, Gelskey SC, Landry RG, Matthews DC, Sandhu HS. A placebo controlled multi-centred evaluation of an anaesthetic gel (Oraqixs) for periodontal therapy. J Clin Periodontol, 2003; 30 (1): 171–175.
10. Pandit N, Gupta R, Chandoke U, Gugnani S. Comparative evaluation of topical and electronic anesthesia during scaling and root planing. J Periodontol, 2010; 81 (1): 1035-1040.
11. Mayor-Subirana G, Yagüe-García J, Valmaseda-Castellón E, Arnabat-Domínguez J, Berini-Aytés L, Gay-Escoda C. Anesthetic efficacy of oraqix® versus hurricaine® and placebo for pain control during non-surgical periodontal treatment. Med Oral Patol Oral Cir Bucal, 2014; 19 (2): e192-e201.
12. Singh S, Jayanth BS, Gupta K. Diminution of pain from needle insertion in palatal mucosa by two topical anaesthetics: a comparative study between lidocaine/prilocaine (EMLA) and benzocaine. J Adv Med Dent Scie Res, 2015; 3(3): 9-15.
13. Ardale MR, Shah MU, Doshi YS, Bajaj M, Sonawane MR, et al. Efficacy of two local anesthetic gels in the reduction of pain on periodontal probing in a group of individuals with untreated chronic periodontitis: an in vivo study. Int J Sci, 2015: 2(6); 7-12.
14. Shariatmadarahmadi R, Avadi M , Dastani A. Evaluating the effect of EMLA anesthetic gel on the level of pain upon probing in patients with chronic periodontitis. J Res Dento maxillo fac Sci, 2016; 1(4): 26-31.

15. Patel KR, Bhavsar NV, Brahmbhatt NA. Effect of eutectic mixture of local anaesthetics (EMLA) on pain perception during scaling & root planing (SRP) split-mouth, controlled, randomized clinical trial. SM J Dent, 2017;3(1): 1-3.
16. Tharani A, Arun Kumar Prasad P, Esther Naloni H, Renuka Devi R. Painless periodontal probing: a double blinded study to evaluate the effectiveness of intrapocket anesthetic gel. J Inte Dent, 2017,;3(2):1-5.
17. Derman SH, Lowden CE, Kaus P, Noack MJ. Pocket-depths-related effectiveness of an intrapocket anaesthesia gel in periodontal maintenance patients. Int J Dent Hygiene, 2013; 1 (1):1-5.
18. Daneshkazemi A, Abrisham SM, Daneshkazemi P, Davoudi A. The efficacy of eutectic mixture of local anesthetics as a topical anesthetic agent used for dental procedures: A brief review. Anesth Essays Res, 2016; 10(1): 383-387.
19. Hassan A, Chelvan T, Arief EA, Alam MK. Experience of pain or discomfort during and after non surgical periodontal therapy. Int Medi J, 2013; 20(5): 597- 600.