Acta Scientific Dental Sciences (ISSN: 2581-4893)

Volume 6 Issue 7 July 2022

Research Article

"Comparison of Effectiveness of Curcumin and Triamcinolone Acetonide in Treatment of Minor Recurrent Aphthous Stomatitis" - A Randomized Controlled Trial

Sikha Poudyal* and Anuradha Pai

Department of Oral Medicine and Radiology, The Oxford Dental College, Bangalore, India

***Corresponding Author:** Sikha Poudyal, Department of Oral Medicine and Radiology, The Oxford Dental College, Bangalore, India.

DOI: 10.31080/ASDS.2022.06.1413

Received: May 09, 2022

Published: June 20, 2022

Abstract

Background: Recurrent aphthous stomatitis is one of the most common oral mucosal condition and the manifestation of this disease can vary from mild to severe where it can even hinder a person's ability to ingest foods, and affect their quality of life. The exact etiopathogenesis of the disease remains obscure and is not yet very clear. There is no definite curative therapy available because of its multifactorial etiology. The currently available treatment modalities aim towards shortening the duration of ulcer, provide relief from pain, and increase disease-free periods.

Aims and Objectives: The aim of the study was to evaluate the efficacy of curcumin in the treatment of minor recurrent aphthous stomatitis and the efficacy of Triamcinolone acetonide in the treatment of minor recurrent aphthous stomatitis. The objective of the study was to compare the efficacy of curcumin with triamcinolone acetonide in the treatment of minor recurrent aphthous stomatitis.

Materials and Method: 60 patients diagnosed to have minor recurrent aphthous ulcers were recruited for the study and were randomly divided into Group 1 (Curenext gel group -30) and Group 2 (Trioplast gel group - 30). The base line parameters included the size of ulcer, pain score and degree of erythema. They were recorded on the day of the first visit. On day 3 day 5 and day 7 the reduction in size of ulcer, pain and erythema was evaluated.

Results: There was marked improvement noted in both the groups with regard to the size of ulcer, pain and erythema between baseline and day 3, baseline and day 5, baseline and day 7 and day 3 and day 5 and day7. Both group 1 and group 2 were found to be effective in providing relief to the patients by reducing the size of the ulcer, pain and erythema. However when Curcumin gel group was compared with Trioplast gel group it showed significant reduction in ulcer size, pain score and degree of erythema. (P =< 0.001).

Conclusion: The results of the study suggest that both treatment groups were found to be effective in healing of ulcers, reducing the pain and erythema. The treatment of recurrent aphthous stomatitis by group 1 showed significant improvement when compared to group 2 in ulcer size, pain score and erythema proving it to be more beneficial in the treatment of minor RAS.

Keywords: Curcumin; Trioplast; Efficacy; RAS

Abbreviations

RAS: Recurrent Aphthous Stomatitis; VAS: Visual Analogue Scale

Introduction

Recurrent aphthous stomatitis (RAS) is one of the most common oral mucosal disease characterized by painful recurrent single or multiple ulcerations of the oral cavity [1]. The recurrence rate is as high as 50% and is more prevalent in the high socio-economic classes [2]. It can affect children, young adults as well as elderly person because of its recurrent nature. The exact etiology of RAS remains unclear. The formation of ulcers may be contributed by various predisposing factors like mechanical injuries, trauma, vitamin deficiencies, stress, hormonal changes, systemic diseases, food hypersensitivity, menstrual cycle, and anxiety [3]. The recurrent aphthous ulcers are usually small, multiple, ovoid or round with circumscribed margins which have yellow floors and are encompassed by erythematous halo. RAS can be clinically classified mainly into three groups: Minor aphthae, Major aphthae and Recurrent herpetiform ulcers. Minor aphthae is the most common variant that constitute 75-85% of all RAS cases. It ranges from 5mm upto 1 cm in size. Major aphthae constitutes 10-15% of RAS cases and usually exceeds 1 cm. Herpetiform is the least common variant that constitutes less than 5% of RAS cases and are characterized by the appearance of numerous small round ulcers [4]. The diagnosis of RAS is based on the grounds of patient's detailed history and examination of ulcers. While examining any patient with oral ulceration a proper medical and family history needs to be taken. Certain features like the duration and frequency of ulceration, number and site of ulcers, shape, edge and base of ulcers, the surrounding tissue needs to be noted carefully [5]. There are different treatment modalities available for the management of recurrent aphthous stomatitis which includes topical and systemic steroids, antibiotics, mouth rinses, cauterization, and laser treatments. The goals of the treatment are, to decrease the symptoms, to reduce the number and size of the ulcers and to increase the duration of the disease-free state with minimal adverse effects. Topical agents are the first choice of management for RAS. They are cost effective, safe and easily available. Topical corticosteroids are proven to be effective in alleviating the symptoms of RAS [6]. Triamcinolone Acetonide is a fluoride synthetic corticosteroid which is commonly used in the treatment of RAS. The anti-inflammatory actions of corticosteroids includes reduction in exudation of leucocytes and plasma along with maintenance of cellular membrane integrity [1]. As corticosteroids are known to get absorbed systemically even on topical application, they can lead to certain adverse reactions [7].

Natural herbal medicines as an alternative therapy for RAS have been widely used in many countries since decades [8]. Clinical studies on the use of such remedies have reported favourable benefits to patients by reducing the discomfort and duration of ulcers. Curcumin is one amongst them which is the chief component of the spice turmeric and has analgesic, anti-inflammatory, antiseptic, antibacterial, antiviral antifungal and antioxidant properties. Hence, the present study is designed to compare the efficacy of Curcumin with Triamcinolone acetonide in the gel form in the treatment of minor RAS.

Materials and Methods

A randomized, controlled trial was conducted on 60 patients with minor RAS who visited the Department of Oral Medicine and Radiology in The Oxford Dental College Bangalore. The study compared an experimental drug group (Topical Curenext gel) with a standard drug group (Topical Trioplast gel). The participants were blinded to the nature of medication dispensed.

Inclusion criteria

- Patients age ranging from 20 to 50 years.
- Patients presenting with single or multiple minor RAS of less than 48 hours duration.
- Ulcers present in locations easily accessible for evaluation and treatment, such as the buccal mucosa, labial mucosa, floor of the mouth and tongue.

Exclusion criteria

- Patients with history of allergies to Curenext gel and Trioplast gel.
- Patients on any other oral topical medication.
- Pregnancy
- Lactation
- Ulcers as manifestation of systemic diseases.

The entire study process was explained to the patients by one examiner before and informed consent was obtained. The ethical clearance was obtained from institutional ethical board. The

proforma which included demographic data, medical history and study parameters was distributed among the study subjects. After obtaining an informed consent, the enrolled participants were randomly assigned into two groups of 30 each, control group (Trioplast gel) and experimental group (Curenext gel). The patients were divided into Group 1 (Curenext Oral Gel- Curcuma longa extract 10mg, Erythrosine and Titanium Dioxide I. P (Manufactured by Abbott Healthcare Pvt. Limited) and Group 2 (Trioplast Oral Gel-Triamcinolone Acetonide IP 0.1%W/W (Manufactured by ICPA Health Products Limited). The allocation concealment was done through lottery method of randomization. Group 1 patients were instructed to apply Curenext gel on the ulcer thrice a day after meals for one week. Group 2 patients were instructed to apply Trioplast gel on the ulcer thrice a day after meals for one week. The base line parameters were recorded on the first visit itself. On day 3, day 5 and day 7 the reduction in size of ulcer, pain score and degree of erythema were evaluated. In case of any allergic reactions patients were instructed to terminate the usage of medication and inform the investigator immediately. A visual analogue scale was used to evaluate the intensity of pain with markings from 0-10 where 0 indicated no pain, 5 as moderate pain and 10 as worst possible pain. To determine the size of the ulcers, a calibrated William's periodontal probe with millimeter markings was used to measure the ulcer size at the maximum diameter of the ulcer [3]. Degree of erythema was evaluated on a 4 point scale ranging from 0 to 3 based on the methods of Greer., *et al*. with some modifications [9].

Statistical analysis

Sociodemographic parameters like age and gender was considered as potential confounders.

The ulcer size, pain score and erythema was considered as primary outcome parameters. Descriptive analysis of all the explanatory and outcome parameters was done using mean and standard deviation for quantitative variables, frequency and proportions for categorical variables. Both the study group and the control group was compared with respect to all the baseline parameters. The mean differences in the ulcer size pain score and erythema between the two groups was compared at baseline, on day 3, day 5 and day 7.

The mean decline in the ulcer size, pain score and erythema at different follow up periods as compared to baseline was compared within each group by Mann Whitney U test. For multiple comparison of the mean difference in ulcer size, pain score and erythema between different time intervals in each study group Friedman's Test followed by Wilcoxon Signed Rank Post hoc test analysis was used. P value < 0.05 was considered statistically significant. Statistical Package for Social Sciences [SPSS software, version 22.0 was used for statistical analysis.

Results

Out of 60 RAS patients, the age range of patients in Group 1 were 20 - 50 years with a mean age of 27.67 ± 5.91 years and the age range of patients in Group 2 were 20 - 50 years with a mean age of 29.60 ± 7.51 years. The gender distribution in the study sample of 60 individuals, 10 (33.3%) were males and 20 (66.7%) were females in Group 1 and 14(46.7%) were males and 16(53.3%) were females in Group 2 respectively with a p value of 0.29. (Table 1).

At baseline the mean ulcer size for group 1 patients was 5.10 ± 1.35 and that of group 2 patients was 5.17 ± 1.42. Patients were re-

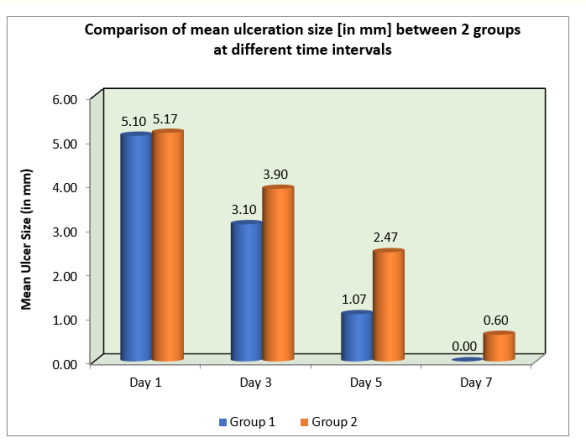
Distribution of age and gender among 2 groups						
Variables		**Group 1 [N = 30]**		**Group 2 [N = 30]**		**P-Value**
		Mean	**SD**	**Mean**	**SD**	
Age	Mean & SD	27.67	5.91	29.60	7.51	0.31[a]
	Range	20 - 50		20 - 50		
		n	%	n	%	
Gender	Males	10	33.3%	14	46.7%	0.29[b]
	Females	20	66.7%	16	53.3%	

Table 1: Distribution of age and gender among study participants.

called on the 3rd 5th and 7th day after using the gel. On day 3 the mean ulcer size for Group 1 patients was 3.10 ± 1.52 and that of Group 2 patients was 3.90 ± 1.37.On day 5, the mean ulcer size of Group 1 patients was 1.07 ± 1.05 and Group 2 patients was 2.47 ± 1.36. On day 7, the mean ulcer size of Group 1 patients was 0.00 ± 0.00 and Group 2 patients was 0.60 ± 0.81. There was significant reduction in the size of ulcer noted from the baseline (5.10 ± 1.35 and 5.17 ± 1.42), in both Group 1 and Group 2 on day 3(3.10 ± 1.52 and 3.90 ± 1.37), day 5 (1.07 ± 1.05 and 2.47 ± 1.36) and day 7(0.00 ± 0.00 and 0.60 ± 0.81) respectively. Between Group 1 and Group 2 there was statistically significant difference observed on 3rd day (P = 0.04) 5th day (P =< 0.001) and 7th day (P =< 0.001). (Table 2 and Graph 1).

Comparison of mean ulceration size [in mm] between 2 groups at different time intervals using Mann Whitney U Test							
Time	**Groups**	**N**	**Mean**	**SD**	**Mean Diff**	**Z**	**P-Value**
Day 1	Group 1	30	5.10	1.35	-0.07	-0.060	0.95
	Group 2	30	5.17	1.42			
Day 3	Group 1	30	3.10	1.52	-0.80	-2.017	0.04*
	Group 2	30	3.90	1.37			
Day 5	Group 1	30	1.07	1.05	-1.40	-4.087	< 0.001*
	Group 2	30	2.47	1.36			
Day 7	Group 1	30	0.00	0.00	-0.60	-4.014	< 0.001*
	Group 2	30	0.60	0.81			

Table 2: Comparison of mean ulceration size (in mm) between 2 groups at different time intervals.
* - Statistically Significant.



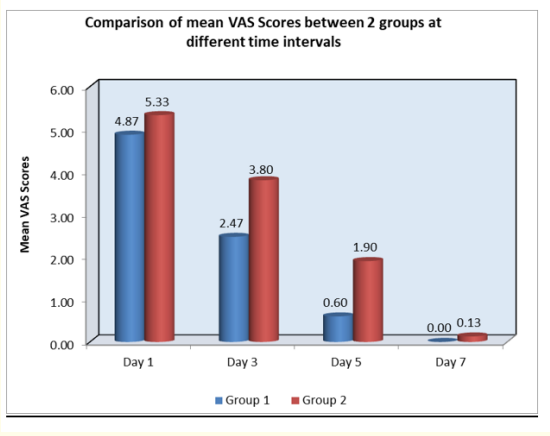
Graph 1: Comparison of mean ulceration size between 2 groups at different time intervals.

The mean pain score at baseline for the patients of Group 1 was 4.87 ± 1.96 and that of Group 2 was 5.33 ± 1.42. The mean pain scores on day 3 for Group 1 was 2.47 ± 1.89 and Group 2 was 3.80 ± 1.56. On day 5 the pain score for Group 1 was 0.60 ± 1.07 and Group 2 was 1.90 ± 1.19. On day 7 the pain score for Group 1 was 0.00 ± 0.00 and Group 2 was 0.13 ± 0.43 respectively. From the baseline (4.87 ± 1.96 and 5.33 ± 1.42) the data depicts a marked reduction in pain in both Group 1 and Group 2 on day 3(2.47 ± 1.89 and 3.80 ± 1.56) day 5 (0.60 ± 1.07 and 1.90 ± 1.19) and day 7 (0.00 ± 0.00 and 0.13 ± 0.43) respectively. Statistically significant difference between Group 1 and Group 2 was observed in 3rd day (P = 0.005) and 5th day (P =< 0.001). (Table 3 and Graph 2).

The mean erythema score at baseline for Group 1 was 1.60 ± 0.50 and that of Group 2 was 1.80 ± 0.41. The mean erythema scores on day 3 for Group 1 was 0.67 ± 0.66 and Group 2 was 1.07 ± 0.52. On day 5, the mean erythema score for Group 1 was 0.13 ± 0.35 and Group 2 was 0.57 ± 0.50. On day 7, the mean erythema score of Group 1 was 0.00 ± 0.00 and that of Group 2 was 0.03 ± 0.18. From the baseline (1.60 ± 0.50 and 1.80 ± 0.41) data shows a slight reduction in erythema in both Group 1 and Group 2 on day 3 (0.67 ± 0.66 and 1.07 ± 0.52) and day 5 (0.13 ± 0.35 and 0.57 ± 0.50) and day 7(0.00 ± 0.00 and 0.03 ± 0.18) respectively. Sta-

Comparison of mean VAS Scores between 2 groups at different time intervals using Mann Whitney U Test							
Time	**Groups**	**N**	**Mean**	**SD**	**Mean Diff**	**Z**	**P-Value**
Day 1	Group 1	30	4.87	1.96	-0.46	-0.971	0.33
	Group 2	30	5.33	1.42			
Day 3	Group 1	30	2.47	1.89	-1.33	-2.821	0.005*
	Group 2	30	3.80	1.56			
Day 5	Group 1	30	0.60	1.07	-1.30	-4.006	< 0.001*
	Group 2	30	1.90	1.19			
Day 7	Group 1	30	0.00	0.00	-0.13	-1.762	0.08
	Group 2	30	0.13	0.43			

Table 3: Comparison of mean VAS score between 2 groups at different time intervals.
* - Statistically Significant.



Graph 2: Comparison of VAS score between 2 groups at different time intervals.

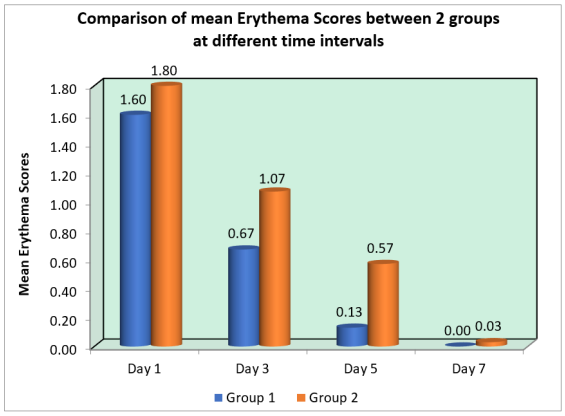
tistically significant difference between Group 1 and Group 2 was observed in 3rd day (P = 0.01) and 5th day (P =< 0.001) (Table 4 and Graph 3).

Within group 1 statistically significant difference were observed between baseline and 3rd day (P value =< 0.001), baseline and 5th day(P value =< 0.001), baseline and 7th day (P =< 0.001)) and 3rd and 5th day (P =< 0.001) 3rd and 7th day(P =< 0.001) and 5th and 7th day (P =< 0.001) and within Group 2 statistically significant difference were observed between baseline and 3rd day (P value =< 0.001), baseline and 5th day (P =< 0.001) baseline and 7th day (P =< 0.001) and 3rd and 5th day (P =< 0.001) 3rd and 7th day (P =< 0.001) and 5th and 7th day (P =< 0.001). (Table 5, 5a and Graph 4).

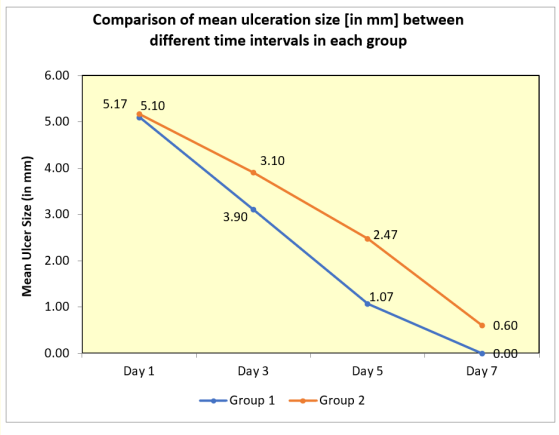
Within group 1 statistically significant difference were observed between baseline and 3rd day (P value =< 0.001), baseline

Comparison of mean Erythema scores between 2 groups at different time intervals using Mann Whitney U Test							
Time	**Groups**	**N**	**Mean**	**SD**	**Mean Diff**	**Z**	**P-Value**
Day 1	Group 1	30	1.60	0.50	-0.20	-1.676	0.10
	Group 2	30	1.80	0.41			
Day 3	Group 1	30	0.67	0.66	-0.40	-2.573	0.01*
	Group 2	30	1.07	0.52			
Day 5	Group 1	30	0.13	0.35	-0.44	-3.489	< 0.001*
	Group 2	30	0.57	0.50			
Day 7	Group 1	30	0.00	0.00	-0.03	-1.000	0.32
	Group 2	30	0.03	0.18			

Table 4: Comparison of mean erythema scores between 2 groups at different time intervals.
* - Statistically Significant.



Graph 3: Comparison of erythema score between 2 groups at different time intervals.



Graph 4: Comparison of mean ulceration size between different time intervals in each group.

Comparison of mean ulceration size [in mm] between different time intervals in each group using Friedman's Test								
Group	**Time**	**N**	**Mean**	**SD**	**Min**	**Max**	**χ^2 Value**	**P-Value**
Group 1	Day 1	30	5.10	1.35	3	7	87.000	< 0.001*
	Day 3	30	3.10	1.52	0	6		
	Day 5	30	1.07	1.05	0	4		
	Day 7	30	0.00	0.00	0	0		
Group 2	Day 1	30	5.17	1.42	3	8	89.141	< 0.001*
	Day 3	30	3.90	1.37	2	7		
	Day 5	30	2.47	1.36	0	6		
	Day 7	30	0.60	0.81	0	3		

Table 5: Comparison of mean ulceration size [in mm] between different time intervals in each group using Friedman's Test.
* - Statistically Significant.

Multiple comparison of mean difference in Ulceration size b/w different time intervals in each study group using Wilcoxon Signed Rank Post hoc Test						
Groups	**D1 vs D3**	**D1 vs D5**	**D1 vs D7**	**D3 vs D5**	**D3 vs D7**	**D5 vs D7**
Group 1	< 0.001*	< 0.001*	< 0.001*	< 0.001*	< 0.001*	< 0.001*
Group 2	< 0.001*	< 0.001*	< 0.001*	< 0.001*	< 0.001*	< 0.001*

Table 5a: Multiple comparison of mean difference in Ulceration size b/w different time intervals in each study group using Wilcoxon Signed Rank Post hoc Test.
* - Statistically Significant.

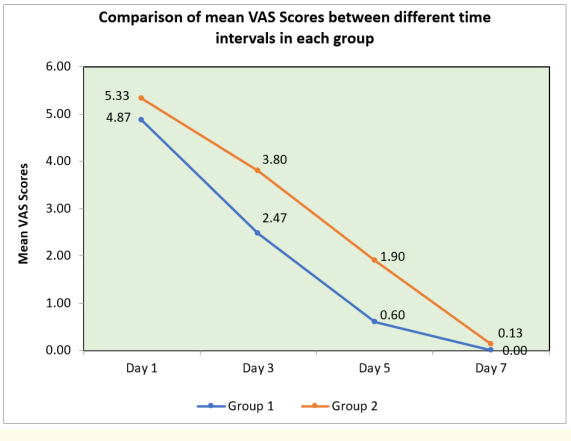
and 5th day(P value =< 0.001) baseline and 7th day (P =< 0.001) and 3rd and 5th day (P =< 0.001) 3rd and 7th day (P =< 0.001) and 5th and 7th day (P = 0.01) and within Group 2 statistically significant difference were observed between baseline and 3rd day (P value =< 0.001), baseline and 5th day (P =< 0.001) baseline and 7th day (P =< 0.001) and 3rd and 5th day (P =< 0.001) 3rd and 7th day (P =< 0.001) and 5th and 7th day (P =< 0.001). (Table 6, 6a and Graph 5).

Comparison of mean VAS Scores for Pain between different time intervals in each group using Friedman's Test								
Group	**Time**	**N**	**Mean**	**SD**	**Min**	**Max**	**c^2 Value**	**P-Value**
Group 1	Day 1	30	4.87	1.96	1	8	83.715	< 0.001*
	Day 3	30	2.47	1.89	0	6		
	Day 5	30	0.60	1.07	0	3		
	Day 7	30	0.00	0.00	0	0		
Group 2	Day 1	30	5.33	1.42	3	8	88.729	< 0.001*
	Day 3	30	3.80	1.56	1	7		
	Day 5	30	1.90	1.19	0	4		
	Day 7	30	0.13	0.43	0	2		

Table 6: Comparison of mean VAS scores between different time intervals in each group.
* - Statistically Significant.

Multiple comparison of mean difference in VAS Scores b/w different time intervals in each study group using Wilcoxon Signed Rank Post hoc Test						
Groups	**D1 vs D3**	**D1 vs D5**	**D1 vs D7**	**D3 vs D5**	**D3 vs D7**	**D5 vs D7**
Group 1	< 0.001*	< 0.001*	< 0.001*	< 0.001*	< 0.001*	0.01*
Group 2	< 0.001*	< 0.001*	< 0.001*	< 0.001*	< 0.001*	< 0.001*

Table 6a: Multiple comparison of mean difference in VAS Scores b/w different time intervals in each study group using Wilcoxon Signed Rank Post hoc Test.



Graph 5: Comparison of mean VAS scores between different time intervals in each group.

Within group 1 statistically significant difference were observed between baseline and 3rd day (P value =< 0.001), baseline and 5th day (P =< 0.001) baseline and 7th day (P =< 0.001) and 3rd and 5th day (P =< 0.001) and 3rd and 7th day (P =< 0.001)and 5th and 7th day (P =< 0.04) and within Group 2 statistically significant difference were observed between baseline and 3rd day (P value =< 0.001), baseline and 5th day (P =< 0.001)baseline and 7th day (P =< 0.001) and 3rd and 5th day (P =< 0.001)and 3rd and 7th day (P =< 0.001) and 5th and 7th day (P =< 0.001). (Table 7, 7a and Graph 6).

Discussion

Recurrent aphthous stomatitis (RAS) commonly referred to as canker sores are characterized by painful, solitary or multiple, recurrent, small, round, or ovoid ulcers with circumscribed margins, having yellow floors that are surrounded by erythematous halo and they heal spontaneously. The primary goals of therapy for RAS

Comparison of mean Erythema Scores between different time intervals in each group using Friedman's Test								
Group	**Time**	**N**	**Mean**	**SD**	**Min**	**Max**	**χ^2 Value**	**P-Value**
Group 1	Day 1	30	1.60	0.50	1	2	75.040	< 0.001*
	Day 3	30	0.67	0.66	0	2		
	Day 5	30	0.13	0.35	0	1		
	Day 7	30	0.00	0.00	0	0		
Group 2	Day 1	30	1.80	0.41	1	2	76.906	< 0.001*
	Day 3	30	1.07	0.52	0	2		
	Day 5	30	0.57	0.50	0	1		
	Day 7	30	0.03	0.18	0	1		

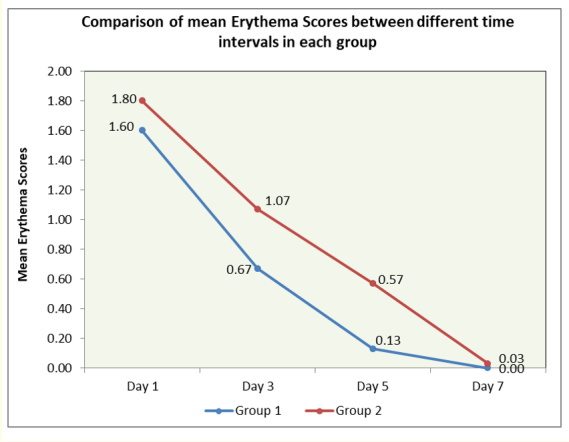
Table 7: Comparison of mean erythema scores between different time intervals in each group.

* - Statistically Significant.

Multiple comparison of mean difference in Erythema Scores b/w different time intervals in each study group using Wilcoxon Signed Rank Post hoc Test						
Groups	**D1 vs D3**	**D1 vs D5**	**D1 vs D7**	**D3 vs D5**	**D3 vs D7**	**D5 vs D7**
Group 1	< 0.001*	< 0.001*	< 0.001*	< 0.001*	< 0.001*	0.04*
Group 2	< 0.001*	< 0.001*	< 0.001*	< 0.001*	< 0.001*	< 0.001*

Table 7a: Multiple comparison of mean difference in Erythema Scores b/w diff. time intervals in each study group using Wilcoxon Signed Rank Post hoc Test.

* - Statistically Significant.



Graph 6: Comparison of mean erythema scores between different time intervals in each group.

are relief of pain, reduction of ulcer size and duration and the restoration of normal oral function. Secondary goals include reduction in the frequency and severity of recurrence and maintenance of remission [10].

A wide range of treatments ranging from topical agents to systemic medications, natural remedies, and homeopathic remedies have been tried in the treatment of RAS. Topical therapy is effective for most patients with RAS but it may alone not decrease the development of new lesions and may not be sufficient for patients who experience frequent episodes of multiple minor RAS. Systemic therapy should be considered for such patients and the potential benefit of the drug should always be weighed carefully against its side effects [11].

The present study aimed to compare the efficacy of Curcumin with Triamcinolone acetonide in the gel form in the treatment of

minor RAS. In this study female predominance was noted in both the groups that accounts for 66.7% (20) which is in accordance with the study conducted by Patil., *et al.* where majority of patients were females. The reason could be due to stress as it has an effect on their immune response. Also certain hormonal changes during menstruation and pregnancy may play a role [12].

The mean age group was found to be 27 years in our study as most of the patients recruited in the study were between the age group of 20-30years which was similar to the study conducted by Rajmane., *et al.* where it was most common in the second and third decades of life [13]. The highest incidence of RAS is among young adults and over a period of time tends to decrease both in severity and frequency [14].

The ulcer size in both Group 1 and Group 2 showed marked improvement between the baseline and 3rd day, baseline and 5th day, baseline and 7th day, 3rd and 5thday, 3rd and 7th day and 5th and 7th day. But Curenext gel was clinically beneficial in hastening healing within a short period when compared to Trioplast gel. Even though both were effective in reducing ulcer size, there was significant difference between Curenext gel and Trioplast gel in reducing the size of the ulcer on 3rd day (P = 0.04) 5th day (P =< 0.001) and 7th day (P =< 0.001) respectively. According to literature the anti-inflammatory properties of Curcumin may be attributed to its potential to inhibit the production of prostaglandins and neutrophil function during inflammation. Therefore the topical application of curcumin is beneficial and effective in preventing inflammation in minor RAS [15].

In our study both Group 1 and Group 2 had marked reduction in VAS scores between baseline and 3rd day, baseline and 5th day, baseline and 7th day, and 3rd and 5th day,3rd and 7th day and 5th and 7th day. But Curenext gel was more effective in alleviating pain within a short period when compared to Trioplast gel. There was significant difference between Curenext gel and Trioplast gel in pain reduction on 3rd day (P = 0.005) and 5th day (P = 0.001) respectively. This is in accordance with Manifar., *et al.* study which showed significant improvement in pain intensity.[6] According to literature Curcumin inhibits cyclooxygenase and lipooxygenase activity and is known for its strong anti-inflammatory and analgesic properties, therefore it is effective in alleviating pain in minor RAS [16].

Both Group 1 and Group 2 had marked reduction in erythema in our study between the baseline and 3rd day, baseline and 5th day, baseline and 7th day, and 3rd and 5th day,3rd and 7th day and 5th and 7th day. Triamcinolone acetonide due to its anti-inflammatory property was also beneficial in reducing the erythema. However Curenext gel was clinically more beneficial in reducing erythema within a short period when compared to Trioplast gel. According to literature Curcumin utilizes multiple molecular pathways to leave its imprint on biological systems and since it is known for its wound healing properties, hence it is effective in reduction of erythema in minor RAS [15].

The possible disadvantage of these both gels could be any kind of allergic reaction to the participants. Subjects were instructed that if any allergic reactions occur they should terminate usage of medication and inform the investigator immediately. But there were no such episodes reported.

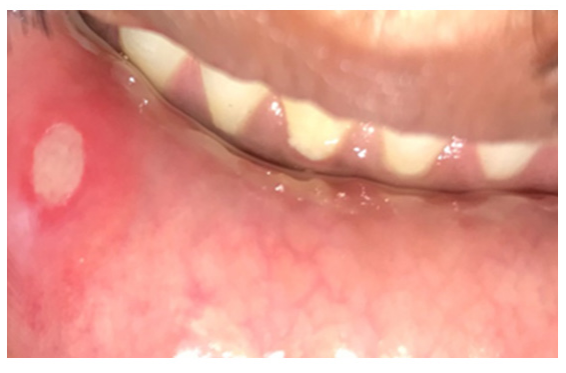


Figure 1: Minor RAS on the lower labial mucosa on the first day.

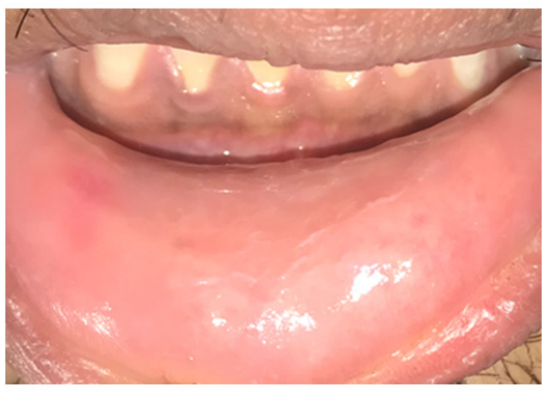


Figure 2: Complete healing of ulcer on the seventh day.

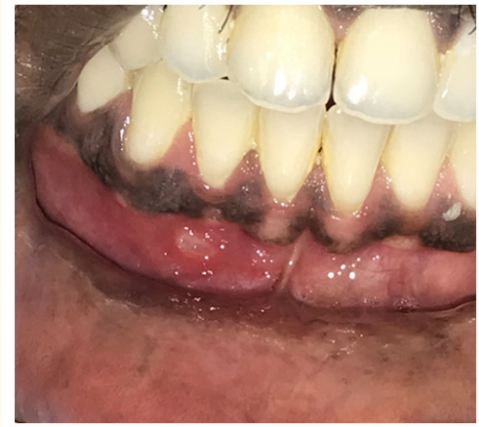


Figure 3: Minor RAS on the lower labial vestibule on the first day.

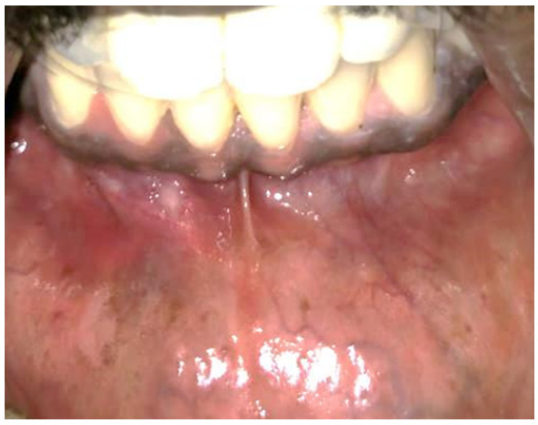


Figure 4: Healing of Minor RAS on the lower labial vestibule on the seventh day.

Future Recommendations

Long-term studies with larger sample size in the form of randomized controlled trails are recommended in the future to determine the effect and potential of Curenext gel in the management of RAS. Also to understand the efficacy better along with its various mechanisms of actions further studies are required. There is also a need to understand about the safety of Curenext gel and whether it can be replaced as a systemic medication in order to avoid complications from other therapeutic agents has to be evaluated in the near future.

Conclusion

Recurrent aphthous stomatitis is one of the most common painful oral mucosal lesion which can cause difficulty in eating, swallowing and speaking. It can hinder the quality of life and well-being to a certain extent. Due to its numerous proposed etiologic factors and variety of treatment modalities, it has gathered a considerable amount of clinical and research attention. However studies on larger samples probably a large cohort study or a randomized controlled studies for a longer follow-up period may be required to understand its therapeutic efficacy for the optimal management of minor RAS.

Bibliography

1. Unur M., *et al*. "Comparison of a new medicinal plant extract and triamcinolone acetonide in treatment of recurrent aphthous stomatitis". *Balkan Journal of Dental Medicine* 18.1 (2014): 29-34.

2. Al-Sandooq TA., *et al*. "Differences between low level laser therapy and triamcinolone acetonide kenalog on healing of recurrent aphthous ulceration". *Annals of the College of Medicine Mosul* 34.1 (2008): 35-41.

3. Shrivastava K., *et al*. "Recurrent Aphthous Ulcers: An In-depth Review". *The Journal of Clinical and Aesthetic Dermatology* 10.3 (2017): 26-36.

4. Shah A., *et al*. "Recurrent Aphthous Stomatitis: A Review" *Journal of Advanced Medical and Dental Sciences Research* 4.3 (2016): 54.

5. Ranganath SP and Pai A. "Is optimal management of recurrent aphthous stomatitis possible? A reality check". *Journal of Clinical and Diagnostic Research: JCDR* 10.10 (2016): ZE08.

6. Manifar S., *et al*. "Curcumin gel in the treatment of minor aphthous ulcer: A randomized, placebo-controlled trial". *Journal of Medicinal Plants* 1.41 (2012): 40-45.

7. Deshmukh RA and Bagewadi AS. "Comparison of effectiveness of curcumin with triamcinolone acetonide in the gel form in treatment of minor recurrent aphthous stomatitis: A random-

ized clinical trial". *International Journal of Pharmaceutical Investigation* 4.3 (2014): 138.

8. Soni UN., *et al*. "Turmeric in Dentistry-The Hidden Potential". *Journal of Pharmaceutical and Biomedical Sciences* 5.01 (2015): 84-89.

9. Mansour G., *et al*. "Clinical efficacy of new aloe vera-and myrrh-based oral mucoadhesive gels in the management of minor recurrent aphthous stomatitis: a randomized, double-blind, vehicle-controlled study". *Journal of Oral Pathology and Medicine* 43.6 (2014): 405-409.

10. Aljbab AA., *et al*. "Management of Recurrent Aphthous Ulcers: An Update". *International Journal of Dentistry and Oral Health* 2.2 (2015).

11. Akintoye SO and Greenberg MS. "Recurrent aphthous stomatitis". *Dental Clinics of North America* 58 (2014): 281-297.

12. Patil S., *et al*. "Prevalence of recurrent aphthous ulceration in the Indian Population". *Journal of Clinical and Experimental Dentistry* 6.1 (2014): e36.

13. Rajmane YR., *et al*. "Prevalence of recurrent aphthous stomatitis in western population of Maharashtra, India". *Journal of Oral Research and Review* 9.1 (2017): 25.

14. Doddamani LG. "Association of Psychological Factors like Stress, Anxiety and Depression in Recurrent Apthous Stomatitis". *International Journal of Oral Health and Medical Research* 3.5 (2017).

15. Grover HS., *et al*. "Curcumin: A medicinal plant and its effects in medicine and dentistry". *International Journal of Contemporary Dental and Medical Reviews* (2015).

16. Singh H., *et al*. "Comparative analysis of therapeutic efficacy of curcumin and triamcinolone acetonide in recurrent aphthous stomatitis-a clinical study". *Journal of Advanced Medical and Dental Sciences Research* 6.4 (2018): 136-138.