ORIGINAL RESEARCH

Efficacy of low level laser therapy and alpha lipoic acid in the treatment of burning mouth syndrome

[1]Dr. Altaf Hussain Chalkoo, [2]Dr. Deeksha Rajput

[1]Head of the Department, [2]Post Graduate Student, Department of Oral Medicine and Radiology, Government Dental College, Srinagar, Jammu and Kashmir, India

Corresponding Author
Dr. Altaf Hussain Chalkoo
Head of the Department, Department of Oral Medicine and Radiology, Government Dental College, Srinagar, Jammu and Kashmir, India

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INTRODUCTION

The International Headache Society(IHS) defines burning mouth syndrome (BMS) as idiopathic orofacial pain with intraoral burning or dysaesthesia recurring daily for more than 2 hours per day and more than 3 months, without any identifiable causative lesions, with and without somatosensory changes.Primarily observed in women aged between 50 and70,burningmuth syndrome typically occurs after or during menopause(1). BMS typically presents with sensations such as as burning, prickling, tingling, itching or numbness affecting the tongue, lip, palate, gums and other oral mucosae(2).Patients often report symptoms such as dysgeusia, xerostomia, altered sensation in the oral mucosa, and psychological issues like anxiety and depression.Although the pathogenesis of BMS has been hypothesized to involve psychological disordersand peripheral and central neuropathy, it is currently classified as idiopathic chronic pain(3).

Scalaetal(2)suggested categorizing Burning Mouth Syndrome (BMS) into two clinical types:Primary or idiopathic BMS ,where both local and systemic causes cannot be identified and secondary BMS which is attributed to organic causes,like oral infections,autoimmune diseases of the oral mucosa(lichen planus),nutritional deficiencies,allergies,irrirtation caused by reflux, candidiasis,diabetesmellitus,or administration of certain drugs(4).

Presently ,there exists a myriad of therapeutic modalities aimed at alleviating primary burning mouth syndrome.Alpha Lipoic Acid(ALA) is a naturally obtained bio active compound that acts as a nutritional cofactor for mitochondrial enzymes and is found to be effective in the treatment of several diseases, including diabetic neuropathy, Alzheimer's disease, and peripheral artery disease, due to its potent free-radical scavenger activity (5) .Alpha Lipoic Acid(ALA) is an antioxidant able to scavenge free radicals, exerting activity in nerve repair(6). The low-level laser light(LLLT) penetrates tissues and acts like a bio modulators, i.e., induces analgesic, anti-inflammatory and repairing effects. The analgesic effect is due to inhibition of nociceptive mediators and release of endogenous analgesic substances, such as endorphins, by the central nervous system, which stops the transmission of painful stimuli [7]. The anti inflammatory effect of LLLT has been confirmed to result from a reduction of the TNF-α and IL-6 salivary levels(8).

This study was conducted to assess the efficacy of low-level laser therapy and alpha-lipoic acid as promising pain control options the treatment of primary burning mouth syndrome .

AIM OF THE STUDY

TO EVALUATE THE EFFICACY OF LOW LEVEL LASER THERAPY AND ALPHA LIPOIC ACID IN REDUCING THE BURNING SENSATION IN PATIENTS WITH BURNING MOUTH SYNDROME.

MATERIAL AND METHOD

INCLUSION CRITERIA

Those patients who fulfilled the diagnostic criteria for primary BMS(Burning sensation in the otherwise clinically normal oral mucosa and absence of local

and systemic factors that can lead to burning sensation of oral mucosa).

EXCLUSION CRITERIA

1. Presence of local and systemic factors and/or on medication
2. Patients with oral lesions or any other type of local alteration such as hyposalivation, trauma, hypersensitivity reactions and action of any physiochemical agents.
3. Inability to comprehend the text of the informed consent.

METHODOLOGY

- The study comprised 30 participants(the sample size was determined)who sought treatment at the department of Oral Medicine and Radiology,Government Dental College,Srinagar.The patient who visited the department with the complain of burning mouth from more than 3 months ,the diagnosis of primary burning mouth was established.
- Local and systemic factors were elimated by CBC,Serumiron,vitamin B12,folic acid,thyroid hormones and blood glucose levels.
- Participants were randomly allocated in two groups(15 IN EACH)-LLLT&Alpha Lipoic Acid .
- A visual analog scale(VAS) was applied to evaluate the efficacy of treatment in terms of symptom relief.

1. LOW LEVEL LASER THERAPY GROUP

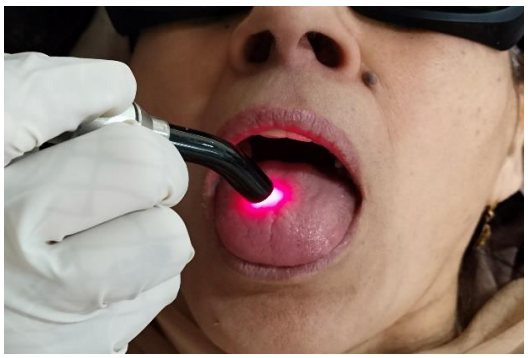
Patients were given laser therapy (2-3 times a week) for 4 weeks with first and last sessions for evaluation. The laser beam was directed at the areas affected by the burning sensation, with the laser fiber tip being in light contact mode with the oral mucosa for 10 s. In patients with extensive burning areas, each location for 10 s (Figure 2).**The parameters used were as follows:**

a) WAVELENGTH-980nm
b) FLUENCY-12J/cm2
c) POWER-0.2 W
d) APPICATION TIME PER POINT-60 seconds
e) MODE:CONTINUOUS MODE
f) DISTANCE-LIGHT CONTACT MODE
g) LASER PROBE PLACED PERPENDICULAR TO TARGET TISSUE.

2. ALPHA LIPOIC ACID GROUP

Patients in this group were treated for 30 days with 600 mg ALA(Figure 3) 1tablet after meal.Patients were clinically assessed every 7 days,for 4 weeks based on VAS.

Figure 1



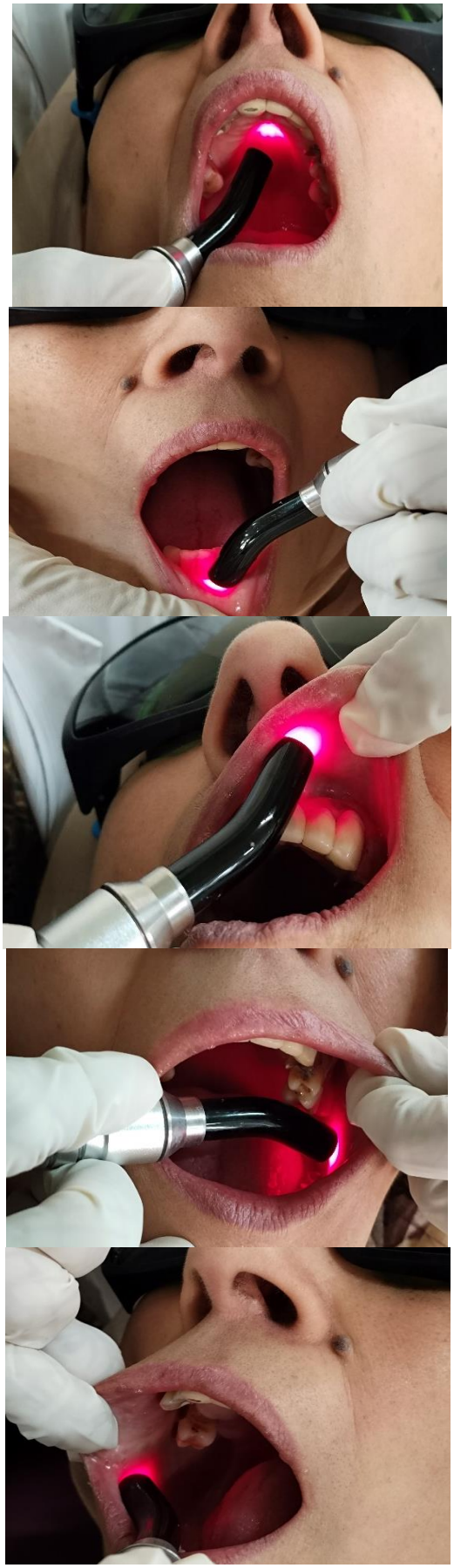


Figure2: LOW LEVEL LASER THERAPY being administered to various locations within the oral mucosa.

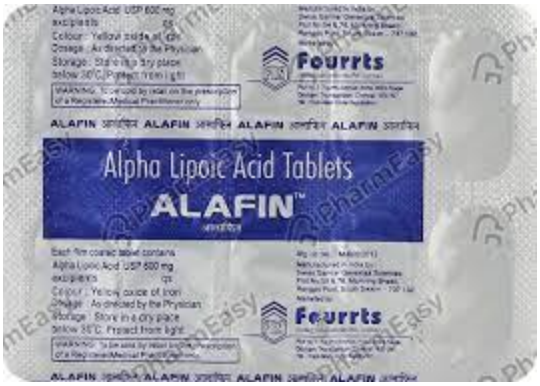


Figure 3:Alpha Lipoic Acid Tabelets

STATISTICAL METHODS

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Statistical software SPSS (version 20.0) and Microsoft Excel were used to carry out the statistical analysis of data. Continous variables were expressed as Mean±SD and categorical variables were summarized as frequency and percentages. Kolmogrov-Smirnov test was applied to test the normality of data. Student's independent t-test was employed for inter group analysis of data. For intra-group analysis of data, paired t-test was applied. Chi-square test or Fisher's exact test, whichever appropriate, was applied for comparison of categorical variables. Graphically the data was presented by bar diagrams. A P-value of less than 0.05 was considered statistically significant.

RESULTS

Our study sample encompassed 30 patients with primary burning mouth syndrome:15 patients were assigned to group A(LLLT GROUP) where as 15 were assigned to group B(Alpha Lipoic Acid group).The mean age in group A was 60.1years and group B was 61.7 years (TABLE 1).There was preponderance of females in both the groups(TABLE 2).When it comes to locations involved in the oral mucosa in both the groups(TABLE 30) ,the tongue was most frequently affected (in all cases,100%) followed by buccal mucosa (46.7%),lips were affected in 40%of the cases and the site which experienced minimal involvement was the palate(6.7%).

Before the commencement of treatment the average VAS score in Group A was 7.5 and in Group B was 7.4 with a P-value 0.692 (TABLE 4&5).Following the treatment ,the average value of VAS score decreased to 1.2 in group A and 2.9 in group B with a P-value of 0.002 which is statistically significant difference. When it comes to the Intra-group comparison based on VAS score in two groups(TABLE6),the difference was statistically signifact with P-values less than 0.001.

Table 1: Age distribution of study patients in two groups

Group	N	Mean	SD	Range	P-value
Group A	15	60.1	8.17	45-75	0.612
Group B	15	61.7	8.86	49-82	

Group A (Laser Group); Group B (Alphalapoic acid Group)

Table 2: Gender distribution of study patients in two groups

Gender	Group A		Group B		P-value
	No.	%age	No.	%age	
Male	1	6.7	2	13.3	0.543
Female	14	93.3	13	86.7	
Total	15	100	15	100	

Table 3: Site involved in two groups

Site Involved	Group A		Group B		Total		P-value
	No.	%age	No.	%age	No.	%age	
Tongue	15	100	15	100	30	100	1.000
Buccal mucosa	6	40.0	8	53.3	14	46.7	0.464
Lips	5	33.3	6	40.0	11	36.7	0.705
Palate	5	33.3	1	6.7	6	20.0	0.171

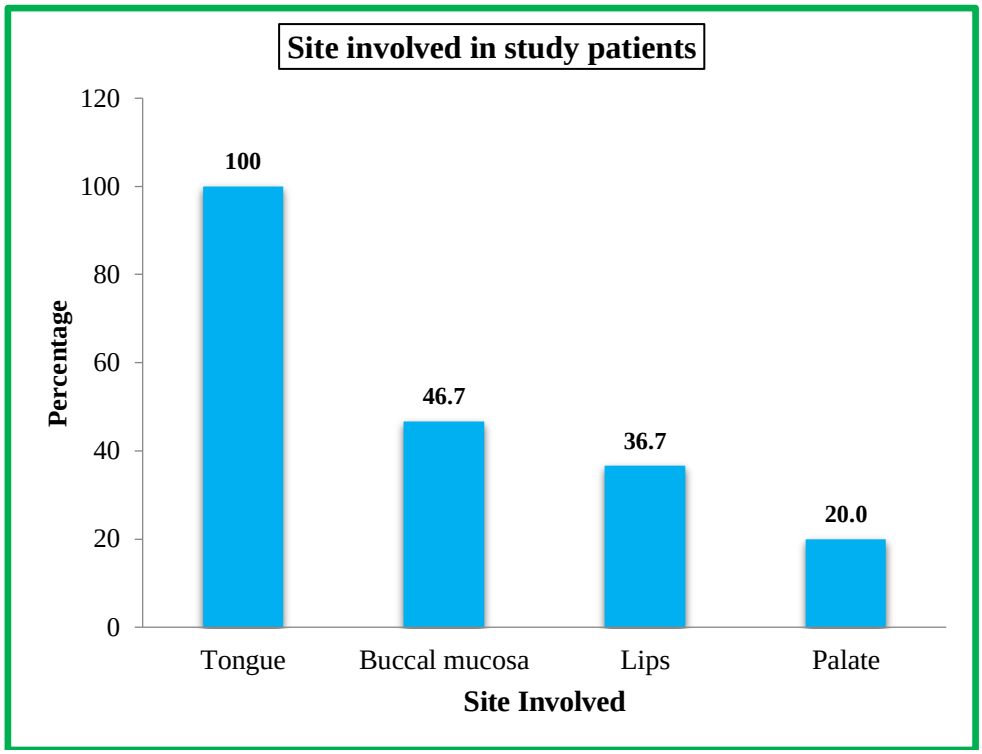


Table 4: Comparison based on VAS in two groups before treatment					
Group	**N**	**Mean**	**SD**	**95% CI**	**P-value**
Group A	15	7.5	0.838	7.07-7.99	0.692
Group B	15	7.4	0.985	6.85-7.95	

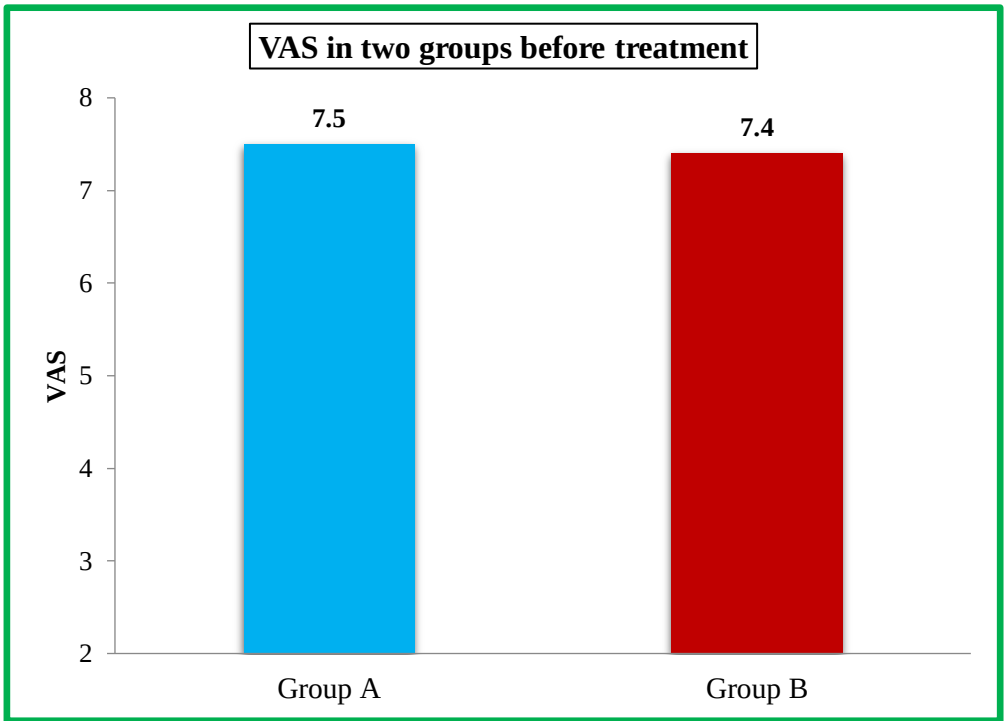


Table 5: Comparison based on VAS in two groups after treatment					
Group	**N**	**Mean**	**SD**	**95% CI**	**P-value**
Group A	15	1.2	1.37	0.43-1.96	0.002*
Group B	15	2.9	1.39	2.17-3.70	

*Statistically Significant Difference (P-value<0.05); CI: Confidence Interval

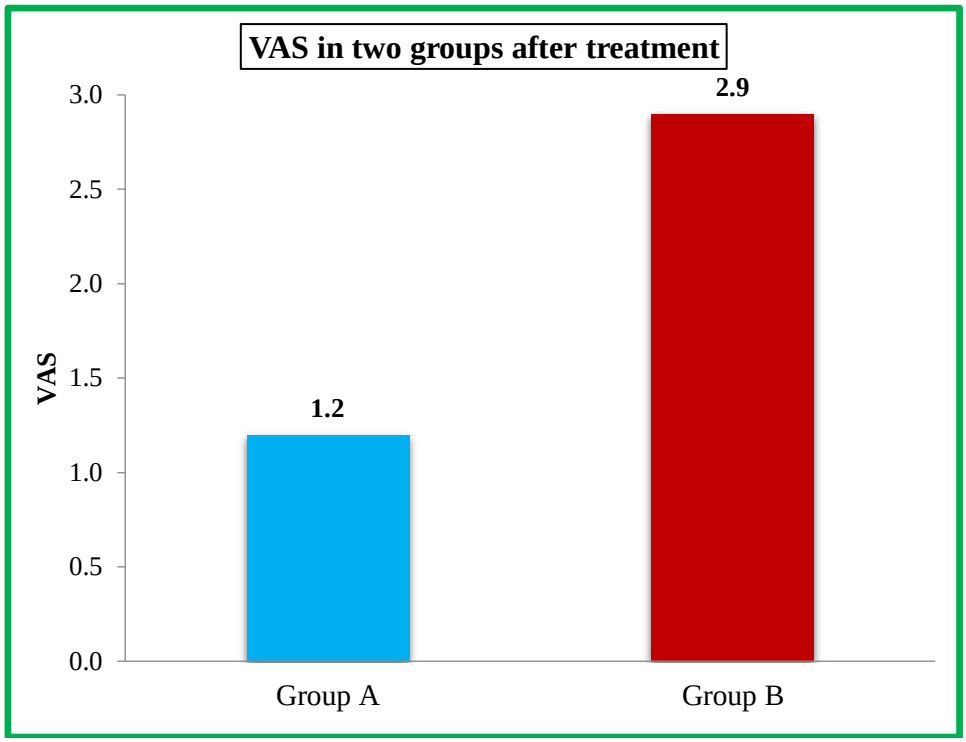
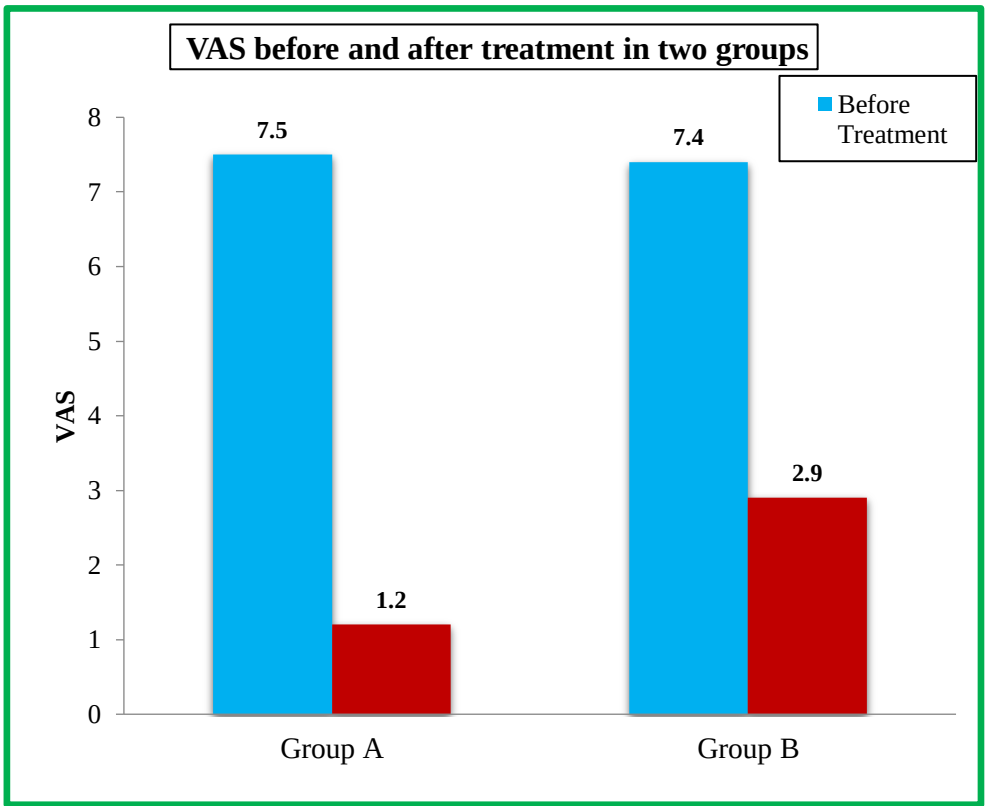


Table 6: Intra-group comparison based on VAS before and after treatment in two groups

Group	Before Treatment		After Treatment		Difference	P-value
	Mean	SD				
Group A	7.5	0.838	1.2	1.37	6.3	<0.001*
Group B	7.4	0.985	2.9	1.39	4.5	<0.001*

*Statistically Significant Difference (P-value<0.05)



DISCUSSION

Diagnosing and classifying primary burning mouth syndrome (BMS) and Secondary Oral burning pose the initial challenge while evaluating a patient experiencing a burning sensation in the mouth (9).The etiology of Burning Mouth Syndrome (BMS) remains a subject of debate.Rarely attributed to a single cause,it predominantly has a multifactorial origin,with systemic factors and local factors and psychological factors such as stress,anxiety and depression playing a signicantrole.In this study,the diagnosis of Primary BMS was typically reached after ruling out all other potential causes,including local and systemic causes((7).The intensity of the burning sensation was assessed using the Visual Analog Scale(VAS)both before and after treatment.

According to a comprehensive literature review,Burning Mouth Syndrome (BMS) can impact individuals across a wide age spectrum,but the mean age of onset is approximately 60 years.Rarely observedbefore the third decade of life,BMS occurs significantly more often in women,with a prevalence seven times higher compared tomen.Furthermore,up to 90% of affected women are experiencing menopause(10).The findings of the present study align with and substantiate these established patterns.

In our sample,the tongue exhibited symptoms in 100%of patients,consistent with existing literature which indicates that the tip and the lateral border of the tongue are the most frequently affected sites in cases of burning mouth syndrome(11). Similar findings have been reportedbyDanhaueret al.(12).Before the commencement of treatment the mean VAS in both the groups was 7.5 and 7.4.

Alpha Lipoic Acid (ALA) serves as an antioxidant,effectively scavenging free radicals and aiding in nerve repair. The low-level laser therapy acts like a bio modulators, i.e., induces analgesic, anti-inflammatory and repairing effects.The analgesic effect is due to inhibition of nociceptive mediators and release of endogenous analgesic substances, such as endorphins, by the central nervous system, which stops the transmission of painful stimuli(13).Theanti inflammatory effect of LLLT has been confirmed to result from a reduction of the TNF-α and IL-6 salivary levels (8).

The findings of the current study showcase that Low Level Laser Therapy (LLLT) and Alpha-Lipoic Acid (ALA) are effective treatment for alleviating symptoms of burning mouth syndrome.However Low Level Laser Therapy yields faster and effective outcomes.

CONCLUSION

The findings of thiss study suggest that both Low-Level Laser Therapy and Alpha Lipoic Acid are effective treatments for burning mouth symptoms.LLLT,inparticular,appears to be more efficient in reducing the burning sensation.Additionally,it is safe,non-invasive and easy to administer.Therefore,LLLTpresents a valuable alternative to traditional BMS treatment methods like Gabapentin,but further research with larger sample sizes and longer follow-up periods is needed to establish its efficacy conclusively.

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