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A Comparative Study of Platelet-Rich Plasma Versus Intralesional Triamcinolone Acetonide in the Management of Chronic Ulcer of the Buccal Mucosa

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Abstract

Background: Chronic ulcers of the buccal mucosa are a common and challenging clinical condition associated with persistent pain, burning sensation, difficulty in eating and speaking, restricted mouth opening, and impaired quality of life. Intralesional triamcinolone acetonide is a widely accepted treatment because of its potent anti-inflammatory action. However, platelet-rich plasma (PRP), an autologous concentrate rich in growth factors, has recently emerged as a promising regenerative therapy that enhances tissue repair and accelerates wound healing.

Methods: This prospective comparative study was conducted in the Department of Otorhinolaryngology, Dr. B.S. Kushwah Institute of Medical Sciences, Kanpur, from July 2025 to june 2026. A total of 60 patients, aged 15–60 years with clinically diagnosed chronic buccal mucosal ulcers were enrolled. Patients presenting to the outpatient department with pain, burning sensation in the oral cavity, difficulty in mouth opening, and dribbling of saliva were screened for eligibility. Eligible participants were equally allocated into two groups (30 patients each). **Group A** received intralesional platelet-rich plasma (PRP), while **Group B** received intralesional triamcinolone acetonide. Clinical outcomes, including ulcer healing, pain relief, recurrence, and treatment-related adverse effects, were evaluated and compared during the follow-up period.

Results: Both treatment modalities resulted in clinical improvement; however, patients treated with PRP demonstrated superior therapeutic outcomes. Group A showed faster ulcer healing, greater reduction in pain, fewer treatment-related adverse effects, and significantly lower recurrence rates than Group B. Recurrence was observed in only **2 of 30 patients (6.7%)** in the PRP group compared with **18 of 30 patients (60.0%)** in the triamcinolone acetonide group (**$p < 0.001$**), indicating a significantly more sustained therapeutic response with PRP. No serious complications were observed in either treatment group.

Conclusion: Intralesional platelet-rich plasma is a safe, effective, and well-tolerated treatment modality for chronic buccal mucosal ulcers. Compared with intralesional triamcinolone acetonide, PRP provides

enhanced tissue regeneration, faster clinical healing, significantly lower recurrence rates, and minimal adverse effects. PRP may, therefore, be considered a promising regenerative alternative for the management of chronic buccal mucosal ulcer……

Keywords: Chronic buccal mucosal ulcer; Intralesional triamcinolone acetonide,Platelet-rich plasma (PRP); Regenerative therapy;.

Introduction

Chronic ulcers of the buccal mucosa are commonly encountered in otorhinolaryngology (ENT), general surgery, and oral medicine practice. They are characterized by persistent ulceration of the oral mucosa lasting for more than two weeks and are frequently associated with pain, burning sensation, difficulty in eating and speaking, restricted mouth opening, and drooling of saliva. These symptoms significantly impair nutritional status, oral function, and the overall quality of life of affected patients. At Dr. B.S. Kushwah Institute of Medical Sciences, Kanpur, chronic buccal mucosal ulcers constitute a considerable proportion of patients attending the outpatient department.

The etiology of chronic oral ulcers is multifactorial and includes recurrent aphthous stomatitis, chronic traumatic ulcers, inflammatory disorders, autoimmune diseases, nutritional deficiencies, infections, and potentially malignant conditions. Although the underlying cause varies, persistent inflammation and delayed wound healing remain the principal factors responsible for prolonged ulceration. Early diagnosis and appropriate management are therefore essential to relieve symptoms, promote healing, and prevent recurrence.

Intralesional corticosteroids, particularly triamcinolone acetonide, are considered the standard treatment for chronic inflammatory oral ulcers because of their potent anti-inflammatory and immunosuppressive properties. They effectively reduce pain, edema, and inflammation, thereby accelerating symptomatic relief. However, prolonged or repeated corticosteroid therapy may be associated with local adverse effects, secondary infection, mucosal atrophy, and recurrence following cessation of treatment. These limitations have encouraged the search for safer and more regenerative therapeutic alternatives.

Platelet-rich plasma (PRP) is an autologous biological product obtained by concentrating platelets from the patient's own blood. It contains a high concentration of growth factors, including platelet-derived growth factor (PDGF), transforming growth factor-beta (TGF-β), vascular endothelial growth factor (VEGF), epidermal growth factor (EGF), and insulin-like growth factor (IGF). These bioactive molecules stimulate angiogenesis, fibroblast proliferation, collagen synthesis, epithelial regeneration, and tissue remodeling, thereby enhancing the natural wound-healing process. Owing to its regenerative potential, PRP has been increasingly used in various surgical, orthopedic, dermatological, and oral conditions.

In the present study, all patients received standard oral hygiene measures before treatment, including rinsing with 0.2% chlorhexidine mouthwash and cleansing of the ulcer with povidone-iodine under aseptic precautions. Patients were subsequently treated with either intralesional platelet-rich plasma or intralesional triamcinolone acetonide and were followed prospectively to evaluate pain relief, reduction in burning sensation, , ulcer healing, recurrence, and treatment-related adverse effects.

The present prospective comparative study was undertaken to evaluate and compare the efficacy and safety of intralesional platelet-rich plasma and intralesional triamcinolone acetonide in the management of chronic ulcers of the buccal mucosa. The findings of this study may help establish PRP as an effective

regenerative alternative to conventional corticosteroid therapy, with the potential for improved healing and reduced recurrence.

Materials and Methods

Study Design and Setting

This prospective comparative study was conducted in the Departments of Otorhinolaryngology (ENT) and General Surgery at Dr. B.S. Kushwah Institute of Medical Sciences, Kanpur, Uttar Pradesh, India, from **July 2025 to June 2026**…

Sample Size

A total of **60 patients** with chronic ulcers of the buccal mucosa were enrolled in the study. Eligible patients were randomly allocated into two equal groups (30 patients in each group).

- **Group A (n = 30):** Intralesional Platelet-Rich Plasma (PRP)
- **Group B (n = 30):** Intralesional Triamcinolone Acetonide

Inclusion Criteria

Patients fulfilling the following criteria were included in the study:

- Age between **18 and 50 years**.
- Chronic ulcer of the buccal mucosa persisting for **more than 3 weeks**.
- Clinically diagnosed traumatic ulcer.
- Recurrent aphthous ulcer.
- Patients willing to participate and provide written informed consent.

Exclusion Criteria

Patients with the following conditions were excluded:

- Histopathologically confirmed malignant ulcers.
- Tuberculous, fungal, or syphilitic ulcers.
- Patients receiving systemic immunosuppressive therapy.
- Pregnant or lactating women.
- Uncontrolled diabetes mellitus.
- Severe systemic illness or any condition likely to interfere with wound healing.
- Patients with bleeding disorders or platelet dysfunction.

Demographic Distribution

A total of **60 patients** were included in the study. In **Group A (PRP)**, there were **18 (60.0%) males** and **12 (40.0%) females**. In **Group B (Triamcinolone Acetonide)**, there were **20 (66.7%) males** and **10 (33.3%) females**.

Table 1. Demographic Distribution of Study Participants

VARIABLES	GROUP A=30 PT'S (PRP)	GROUP B=30PT'S (Triamcinolone Acetonide)	TOTAL
MALE	18	20	38
FEMALE	12	10	22
TOTAL	30	30	60

Treatment Protocol

Before administration of either treatment, all patients were instructed to rinse their mouth with **0.2% chlorhexidine mouthwash**. The ulcer surface was cleaned using a sterile swab soaked in **10% povidone-iodine (Betadine)** under strict aseptic precautions.

Group A: Intralesional Platelet-Rich Plasma (PRP)

Approximately **10–15 mL** of autologous venous blood was collected from each patient under aseptic conditions. Platelet-rich plasma was prepared using the standard centrifugation technique, yielding approximately **1–4 mL** of PRP. The PRP was injected intralesionally at multiple sites in and around the ulcer using a sterile tuberculin or insulin syringe. Treatment was administered **once weekly for up to four weeks or until complete healing**, whichever occurred earlier.

Group B: Intralesional Triamcinolone Acetonide

Patients received **intralesional triamcinolone acetonide (10–40 mg/mL)** injected circumferentially around the margins of the ulcer at multiple points using a sterile tuberculin syringe to ensure uniform drug distribution. Treatment was administered **once weekly for up to four weeks or until complete healing**, whichever occurred earlier.

Clinical Assessment

Patients in both groups were evaluated at baseline and subsequently at **weekly intervals for four weeks**. The following clinical parameters were assessed during each visit:

- Ulcer size (mm)
- Pain intensity using the Visual Analog Scale (VAS)
- Time required for complete ulcer healing
- Treatment-related adverse effects
- .Recurrence during follow-up

Ulcer Grading

Ulcers were graded according to their maximum clinical diameter as follows:

Table 2. Distribution of Patients According to Ulcer Size

GRADE	ULCER SIZE	GROUP A=30(PTS) PRP	GROUP –B=30(PTS) TRIAMICINOLONE ACETENOID	TOTAL
GRADE-1	<5mm	4	2	6
GRADE-2	5-10 mm	8	5	13
GRADE-3	11-20 mm	14	18	32
GRADE-4	>20mm	4	5	9
TOTAL		30	30	60

Outcome Measures

The primary outcome measures included:

- Reduction in ulcer size.

- Reduction in pain intensity (VAS score).
- Time to complete ulcer healing..
- Recurrence rate.
- Treatment-related adverse effects.

Statistical Analysis

The collected data were entered into Microsoft Excel and analyzed using **Statistical Package for the Social Sciences (SPSS) software (version 26.0 or later)**. Continuous variables were expressed as **mean ± standard deviation (SD)**, whereas categorical variables were presented as frequencies and percentages.

Comparisons between the two treatment groups were performed using the **Student's t-test** for continuous variables and the **Chi-square test** or **Fisher's exact test** for categorical variables, as appropriate. A **p-value of <0.05** was considered statistically significant.

Results

A total of **60 patients** with chronic ulcers of the buccal mucosa were included in the study and equally allocated into two groups: **Group A (Intralesional Platelet-Rich Plasma, n = 30)** and **Group B (Intralesional Triamcinolone Acetonide, n = 30)**. Clinical outcomes were assessed at baseline and during weekly follow-up for four weeks.

Table 1. Demographic Distribution of Study Participants

VARIABLES	**GROUP A=30 PT'S** (PRP)	**GROUP B=30PT'S (Triamcinolone Acetonide)**	**TOTAL**
MALE	**18**	**20**	**38**
FEMALE	**12**	**10**	**22**
TOTAL	**30**	**30**	**60**

Ulcer Size

Both treatment groups demonstrated a progressive reduction in mean ulcer size during the follow-up period.

Table 2. Comparison of Mean Ulcer Size During Follow-up

FOLLOW-UP	**GROUP-A(PRP) MEAN+/-SD**	**GROUP-B(TRIAMICINOLONE ACETONIDE).. MEAN+/-SD**	**P-VALUE**
DAY-0	22+/-4.2	26+/-4.8	0..001
DAY-7	16+/-3.6	12+/-3.1	<0.001.
DAY-14	10+/-2.82.4	8+/-2.4	0.004
DAY-21	2+/-1.3	NIL	<0.001

Both groups showed a significant reduction in ulcer size compared with baseline. Progressive healing was observed throughout the follow-up period.

Pain Assessment (Visual Analogue Scale)

Pain intensity was assessed using the **Visual Analogue Scale (VAS)**.

Table 3. Distribution of Patients According to VAS- Score……

VAS(Score)	severity	Group-A	Group-B	TOTAL
0	NO PAIN	8	2	10
0-3	MILD PAIN	4	9	13
4-6	MODERATE PAIN	11	7	18
7-10	SEVERE PAIN	7	12	19

Table 4. Mean Pain Score During Follow-up.

FOLLOW-UP	Group-A	Group-B	TOTAL
DAY-0	22	28	50
DAY-7	16	14	30
DAY-14	8	4	12
DAY-21	NIL	NIL	NIL

Pain scores progressively decreased in both treatment groups throughout the study period, indicating effective symptomatic improvement.

Ulcer Healing

Table 5. Complete Healing During Follow-up

Follow-up	**Group-A**	**Group-B**	**TOTAL**
DAY-7	**9**	**11**	**20**
DAY-14	**17**	**18**	**35**
DAY-21	**4**	**01**	**05**

By the end of the follow-up period, all patients in both groups achieved complete ulcer healing.

Recurrence

Table 6. Recurrence Rate

OUTCOME	Group-A(PRP) NO=30	Group-B(TRIAMCINOLONE ACETONIDE) NO=30	P-VALUE
NO RECURRENCE	28	12	<0.001
RECURRENCE	2	18	<0.001

The recurrence rate was significantly lower in the PRP group than in the triamcinolone acetonide group (**6.7% vs. 60.0%; p < 0.001**), indicating a more sustained therapeutic effect of PRP.

Adverse Effects

Table 7.. Treatment-related Adverse Effects

Adverse effects	Group-A(PRP)	Group-B(TRIAMCINOLONE ACETONIDE)	P-VALUE
INJECTION –SITE PAIN	18	17	1.000
SWELLING	12	18	0.196.
BLEEDING	8	1	0.026
INFECTION	0	0	1.000
ALLERGIC REACTION	2	0	0.492
MUCOSAL ATROPHY	0	10	< 0.001
ORAL CANDIDIASIS	0	0	1.000

Interpretation :-

Bleeding was significantly more common in group- A(p=0.026)but.mucosal atrophy was significantly more common in group-B(P=<0.001)…

Injection-site pain and swelling were the most common transient adverse effects observed in both groups. Mucosal atrophy was observed only in patients receiving intralesional triamcinolone acetonide, whereas no cases of infection or oral candidiasis were reported in either group.

Overall Treatment Outcome

Both intralesional platelet-rich plasma (PRP) and intralesional triamcinolone acetonide were effective in reducing ulcer size, relieving pain, and promoting ulcer healing. However, patients treated with PRP demonstrated superior long-term outcomes, particularly with respect to tissue regeneration and recurrence.

The recurrence rate was significantly lower in the PRP group than in the triamcinolone acetonide group (**2/30 vs. 18/30; p < 0.001**), suggesting a more durable therapeutic response. In addition, PRP was associated with fewer long-term treatment-related complications, whereas mucosal atrophy was observed only in the triamcinolone group.

Overall, intralesional PRP proved to be a safe and effective regenerative treatment for chronic ulcers of the buccal mucosa and may represent a preferable therapeutic alternative to intralesional triamcinolone acetonide for reducing recurrence and promoting sustained healing.

Further multicentric studies with a larger sample size and longer follow-up are recommended to validate these findings.

Discussion

In the present prospective comparative study involving 60 patients with chronic buccal mucosal ulcers, both intralesional platelet-rich plasma (PRP) and intralesional triamcinolone acetonide demonstrated significant clinical improvement in terms of reduction in ulcer size, pain relief, and promotion of ulcer healing. However, PRP therapy showed superior long-term outcomes, particularly with respect to recurrence prevention and treatment-related adverse effects.

Intralesional triamcinolone acetonide remains one of the most commonly used therapies for chronic inflammatory oral ulcers due to its potent anti-inflammatory and immunosuppressive properties. It

reduces inflammatory mediators, decreases local immune activity, and provides rapid symptomatic relief. In the present study, triamcinolone acetonide demonstrated effective early reduction in pain and ulcer-related symptoms. However, corticosteroid therapy primarily suppresses inflammation and does not directly stimulate tissue regeneration. Long-term or repeated steroid administration may also be associated with complications such as mucosal atrophy and local tissue changes.

Platelet-rich plasma represents a regenerative therapeutic approach due to its high concentration of platelets and growth factors. The growth factors released from activated platelets, including platelet-derived growth factor (PDGF), transforming growth factor-beta (TGF-β), vascular endothelial growth factor (VEGF), and epidermal growth factor (EGF), play an important role in angiogenesis, fibroblast proliferation, collagen formation, epithelial regeneration, and tissue remodeling. These biological effects may explain the improved tissue healing response and lower recurrence observed in patients treated with PRP.

In the present study, the recurrence rate was significantly lower in the PRP group than in the intralesional triamcinolone acetonide group. Recurrence was observed in 2 of 30 patients (6.7%) in the PRP group, compared with 18 of 30 patients (60%) in the triamcinolone acetonide group, representing a statistically significant difference ($p < 0.001$). This finding suggests that PRP may provide a more sustained therapeutic effect by promoting tissue regeneration and enhancing the natural healing process, rather than primarily suppressing local inflammation.

Regarding adverse effects, injection-site pain, swelling, bleeding, allergic reactions, and mucosal atrophy were observed in the present study. In the PRP group, injection-site pain was reported in 18 patients (60%), swelling in 12 (40%), bleeding in 8 (26.7%), and allergic reactions in 2 (6.7%). No cases of mucosal atrophy were observed in the PRP group. In contrast, in the triamcinolone acetonide group, injection-site pain occurred in 17 patients (56.7%), swelling in 18 (60%), bleeding in 1 (3.3%), and mucosal atrophy in 10 patients (33.3%). No allergic reactions were reported in this group.

The occurrence of mucosal atrophy was significantly higher in the triamcinolone acetonide group ($p < 0.001$), suggesting that repeated or prolonged exposure to intralesional corticosteroids may be associated with local tissue atrophy. Overall, PRP appeared to be associated with fewer long-term local adverse effects, particularly with respect to mucosal atrophy, although transient injection-site pain and bleeding were relatively more frequent in the thePRP group…….

The findings of this study are consistent with the increasing evidence supporting the role of autologous PRP in regenerative medicine. PRP has demonstrated beneficial effects in chronic ulcer.

Conclusion

The present study demonstrates that both intralesional platelet-rich plasma (PRP) and intralesional triamcinolone acetonide are effective treatment modalities for chronic ulcers of the buccal mucosa. While triamcinolone acetonide provides effective anti-inflammatory action and early symptomatic relief, PRP offers additional regenerative benefits with improved tissue healing, significantly lower recurrence rates, and fewer long-term complications.

Based on the findings of this study, intralesional PRP appears to be a safe, effective, and promising alternative to conventional corticosteroid therapy in the management of chronic buccal mucosal ulcers. PRP may represent a valuable regenerative approach for achieving sustained healing and reducing recurrence.

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