

Comparative Evaluation of Intralesional Triamcinolone and Platelet-Rich Plasma for the Management of Trismus in Patients with Oral Submucous Fibrosis: A Prospective Study

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Abstract

Background: Oral submucous fibrosis (OSMF) is a progressive disorder that causes mucosal stiffness, pain, burning sensation, and restricted mouth opening. Intralesional corticosteroids are commonly used, while platelet-rich plasma (PRP) has emerged as a regenerative treatment. **Aim:** To compare intralesional triamcinolone acetonide and PRP in improving mouth opening and relieving symptoms in patients with OSMF. **Materials and Methods:** This prospective comparative study included 20 patients with Grade II or III OSMF. Patients were equally allocated to receive weekly intralesional injections of triamcinolone acetonide or autologous PRP for two months. Mouth opening, pain, and burning sensation were assessed at baseline, one week, three weeks, and two months. Data were analysed using the independent-samples *t*-test and repeated-measures ANOVA. **Results:** Both treatments significantly improved mouth opening, pain, and burning sensation over time ($p < 0.001$). At two months, mouth opening was greater in the triamcinolone group than in the PRP group (29.50 ± 1.08 versus 27.50 ± 1.08 mm; $p = 0.001$). PRP produced greater reductions in pain (1.20 ± 0.42 versus 4.20 ± 0.63) and burning sensation (1.50 ± 0.53 versus 4.30 ± 0.48) at two months (both $p < 0.001$). **Conclusion:** Triamcinolone was more effective in improving mouth opening, whereas PRP provided greater relief from pain and burning sensation.

Keywords: Burning Sensation, Oral Submucous Fibrosis, Platelet-Rich Plasma, Triamcinolone Acetonide, Trismus.

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INTRODUCTION

Oral submucous fibrosis (OSMF) is a chronic, progressive, and potentially malignant disorder characterized by inflammation and fibrosis of the oral mucosa. These changes cause mucosal stiffness, burning sensation, and gradually reduced mouth opening or trismus [1]. OSMF is commonly reported in South and Southeast Asia, particularly India, and frequently affects adolescents and young adults [2]. Areca nut consumption through products such as gutkha, pan masala, supari, and mawa is considered its principal cause [3]. Arecoline stimulates fibroblast activity and collagen production, while copper promotes collagen cross-linking and reduces its breakdown [4].

Trismus is among the most disabling features of OSMF because it interferes with eating, speech, oral

hygiene, and quality of life [5]. Treatment includes cessation of harmful habits, nutritional supplements, antioxidants, physiotherapy, and intralesional medications. Triamcinolone acetonide is commonly used because of its anti-inflammatory and antifibrotic actions. It reduces inflammatory mediators, fibroblast proliferation, and collagen synthesis, thereby improving mucosal flexibility and mouth opening [7].

Platelet-rich plasma (PRP) is an autologous preparation rich in platelets and growth factors that supports angiogenesis, tissue repair, and remodeling [8]. It may improve vascularity and elasticity of the affected oral mucosa with a low risk of immune reactions [9]. However, direct comparisons between PRP and triamcinolone remain limited. Therefore, this prospective study compared their effectiveness in

relieving trismus and associated symptoms in patients with OSMF.

MATERIALS AND METHODS

This prospective comparative clinical study was conducted in the Department of Oral Medicine and Radiology, Bhabha college of dental science, Bhopal. The study was conducted according to the principles of the Declaration of Helsinki and Good Clinical Practice guidelines. Written informed consent was obtained from all participants before enrolment.

The sample size was estimated using the formula for comparing two independent means: $n = [(Z\alpha/2 + Z\beta)^2 \times 2\sigma^2]/\delta^2$, where $Z\alpha/2$ was 1.96 at a 95% confidence level, $Z\beta$ was 0.84 at 80% power, σ represented the expected standard deviation, and δ represented the minimum clinically important difference between the groups. Considering the calculated requirement, feasibility, availability of eligible patients, and study duration, 20 patients were included. The participants were equally allocated into two treatment groups. Group A received intralesional triamcinolone acetonide ($n = 10$), while Group B received intralesional platelet-rich plasma (PRP; $n = 10$).

Patients clinically diagnosed with Grade II or Grade III oral submucous fibrosis (OSMF) according to the Ranganathan classification, presenting with restricted mouth opening and burning sensation, and willing to participate were included. Patients with maxillofacial infections, uncontrolled systemic diseases, bleeding disorders, oral malignancy, mental conditions affecting compliance, or known hypersensitivity to the study medication were excluded. Pregnant and lactating women were also excluded.

At baseline, demographic information, relevant habits, medical history, and clinical findings were recorded. Maximum mouth opening was measured in millimetres as the distance between the incisal edges of the upper and lower central incisors using a Vernier calliper. Pain and burning sensation were separately assessed using a 10-point visual analogue scale (VAS), in which 0 indicated no symptoms and 10 indicated the most severe symptoms.

Patients in Group A received 1 mL of intralesional triamcinolone acetonide containing 40 mg of the drug. Using an insulin syringe, the medication was injected at multiple sites along the palpable fibrotic bands under aseptic conditions. The injections were administered once weekly for two months.

Patients in Group B received autologous PRP injections once weekly for two months. Approximately 10 mL of venous blood was collected in tubes containing acid citrate dextrose. PRP was prepared using an open double-spin technique. The first centrifugation was performed at approximately 1,500 rpm for 10 minutes.

The plasma and buffy coat were then transferred to another sterile tube and centrifuged at approximately 3,000 rpm for 10 minutes. The upper two-thirds of platelet-poor plasma was discarded. The platelet pellet in the remaining plasma was gently resuspended, and the freshly prepared PRP was immediately injected at multiple sites within the fibrotic bands.

Clinical assessments were performed at baseline, one week, three weeks, and two months. The primary outcome was improvement in maximum mouth opening. Reductions in pain and burning sensation were considered secondary outcomes. Adverse effects were monitored throughout the study and recorded descriptively. All participants received the same habit-cessation counselling, antioxidant and multivitamin supplementation, and instructions to perform regular mouth-opening exercises.

Data were entered into Microsoft Excel and analysed using IBM SPSS Statistics version 26.0. Continuous variables were reported as mean and standard deviation, whereas categorical variables were presented as frequencies and percentages. Baseline and follow-up comparisons between the groups were performed using the independent-samples *t*-test. Categorical baseline variables were compared using the chi-square test. Changes in mouth opening, pain, and burning sensation across the assessment periods were evaluated using repeated-measures analysis of variance. A *p*-value of <0.05 was considered statistically significant.

RESULTS

A total of 20 patients were included, with 10 patients in each treatment group. The mean age was 31.20 ± 3.10 years in the triamcinolone group and 31.80 ± 2.95 years in the PRP group. Males constituted 70.0% and 60.0% of the respective groups. Grade III OSMF was more frequent than Grade II OSMF in both groups. No statistically significant differences were observed in age, sex distribution, or OSMF grade, indicating that the groups were comparable at baseline (Table 1).

Mouth opening improved significantly over time in both groups ($p < 0.001$). At two months, mouth opening was significantly greater in the triamcinolone group than in the PRP group (29.50 ± 1.08 versus 27.50 ± 1.08 mm; $p = 0.001$). Pain scores decreased significantly in both groups. The reduction was greater with PRP from the first week onward, with scores at two months of 1.20 ± 0.42 in the PRP group and 4.20 ± 0.63 in the triamcinolone group ($p < 0.001$). Burning sensation also decreased significantly over time in both groups. PRP produced a greater reduction at one week, three weeks, and two months. At two months, the corresponding scores were 1.50 ± 0.53 and 4.30 ± 0.48 ($p < 0.001$). Thus, triamcinolone produced greater improvement in mouth opening, whereas PRP provided greater relief from pain and burning sensation (Table 2).

Table 1: Baseline characteristics of the study participants

Variable	Category	Triamcinolone group (n = 10)	PRP group (n = 10)	p-value
Age (years)	Mean $\pm$ SD	31.20 $\pm$ 3.10	31.80 $\pm$ 2.95	0.934 ^a
Sex	Female	3 (30.0%)	4 (40.0%)	0.910 ^b
	Male	7 (70.0%)	6 (60.0%)	
OSMF grade	Grade II	4 (40.0%)	3 (30.0%)	0.891 ^b
	Grade III	6 (60.0%)	7 (70.0%)	

^aIndependent-samples t-test; ^bChi-square test.**Table 2: Comparison of mouth opening, pain, and burning sensation between the treatment groups**

Clinical parameter	Assessment time	Triamcinolone group (n = 10), mean $\pm$ SD	PRP group (n = 10), mean $\pm$ SD	Intergroup p-value ^a
Mouth opening (mm)	Baseline	18.50 $\pm$ 1.08	19.50 $\pm$ 1.08	0.053
	1 week	21.50 $\pm$ 1.08	21.50 $\pm$ 1.08	1.000
	3 weeks	25.50 $\pm$ 1.08	24.50 $\pm$ 1.08	0.053
	2 months	29.50 $\pm$ 1.08	27.50 $\pm$ 1.08	0.001
Overall intragroup p-value ^b		<0.001	<0.001	—
Pain (VAS score)	Baseline	7.30 $\pm$ 0.48	7.40 $\pm$ 0.52	0.660
	1 week	6.20 $\pm$ 0.63	5.10 $\pm$ 0.57	0.002
	3 weeks	5.10 $\pm$ 0.57	3.20 $\pm$ 0.63	<0.001
	2 months	4.20 $\pm$ 0.63	1.20 $\pm$ 0.42	<0.001
Overall intragroup p-value ^b		<0.001	<0.001	—
Burning sensation (VAS score)	Baseline	7.50 $\pm$ 0.53	7.30 $\pm$ 0.48	0.568
	1 week	6.40 $\pm$ 0.52	5.30 $\pm$ 0.48	0.004
	3 weeks	5.40 $\pm$ 0.52	3.40 $\pm$ 0.52	<0.001
	2 months	4.30 $\pm$ 0.48	1.50 $\pm$ 0.53	<0.001
Overall intragroup p-value ^b		<0.001	<0.001	—

^aIndependent-samples t-test; ^bRepeated-measures ANOVA. A p-value < 0.05 was considered statistically significant.

PRP: platelet-rich plasma; SD: standard deviation; VAS: visual analogue scale.

DISCUSSION

OSMF causes progressive fibrosis of the oral mucosa, resulting in restricted mouth opening, pain, and burning sensation. The present study compared intralesional triamcinolone with PRP in 20 patients with Grade II or III OSMF. The groups were comparable in age, sex, and disease grade at baseline, allowing a reasonable comparison of treatment outcomes.

Both treatments produced a significant improvement in mouth opening during the two-month period. However, the improvement was greater with triamcinolone. Mean mouth opening increased from 18.50 to 29.50 mm in the triamcinolone group, representing a gain of 11 mm. In the PRP group, it increased from 19.50 to 27.50 mm, representing a gain of 8 mm. The difference at two months was statistically significant. Similar improvements following triamcinolone therapy were reported by Shah *et al.*, (2023), Naik *et al.*, (2012), and Ali *et al.*, (2019) [10–12]. Triamcinolone reduces inflammation, suppresses fibroblast activity, and limits collagen formation, which may explain its greater effect on mouth opening.

In contrast, Hydri *et al.*, (2019) and Chandrakapure *et al.*, (2023) reported better improvement in mouth opening with PRP. Differences in OSMF severity, PRP preparation, treatment frequency,

follow-up duration, and associated physiotherapy may account for these conflicting findings [13, 14]. As noted by Lai *et al.*, (1995), treatment response may also vary according to the stage of fibrosis [15].

Pain decreased significantly in both groups, but PRP provided greater relief. At two months, the mean pain score decreased from 7.40 to 1.20 with PRP, compared with a reduction from 7.30 to 4.20 with triamcinolone. This finding agrees with Sharma *et al.*, (2023) and Rajanna *et al.*, (2025), who observed considerable symptomatic improvement following PRP therapy [16, 17]. PRP contains growth factors and bioactive proteins that support mucosal healing, improve local circulation, and regulate inflammation, which may contribute to pain relief.

A similar pattern was observed for burning sensation. The score decreased from 7.30 to 1.50 in the PRP group and from 7.50 to 4.30 in the triamcinolone group. The greater reduction with PRP was evident from the first week and continued throughout follow-up. Comparable benefits were reported by Gyakwad *et al.*, (2024) and Zeb *et al.*, (2025) [18, 19].

Overall, triamcinolone was more effective in improving mouth opening, whereas PRP provided greater relief from pain and burning sensation. These

findings suggest that the treatments may offer different clinical advantages. Nevertheless, the small sample, short follow-up, single-centre design, subjective VAS assessment, and absence of long-term recurrence evaluation limit the generalizability of the findings. Larger randomized studies with longer follow-up are required to confirm these results.

CONCLUSION

Both intralesional triamcinolone and PRP improved clinical outcomes in patients with Grade II and III OSMF. Triamcinolone produced greater improvement in mouth opening, whereas PRP provided better relief from pain and burning sensation. These findings indicate that triamcinolone may be preferred when restricted mouth opening is the main concern, while PRP may be useful for symptomatic relief. However, the small sample and short follow-up limit firm conclusions. Larger randomized studies with longer observation are needed to further confirm these findings.

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