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RESEARCH ARTICLE
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COMPARISON BETWEEN TREATMENT OF ORAL SUBMUCOUS FIBROSIS WITH INTRALESIONAL TRIAMCINOLONE INJECTION VERSUS PLATELET RICH PLASMA

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Abstract

Introduction: Oral Submucous Fibrosis (OSMF) is a chronic and advancing oral condition that develops after consumption of areca nut, resulting in diminished mouth functionality and burning mouth symptoms.

Objective: Whether intralesional triamcinolone injections produce comparable clinical effects to platelet-rich plasma (PRP) therapy when treating OSMF.

Materials and Method: The study was done on patients who received an OSMF diagnosis. The study divided patients between two therapeutic options: intralesional triamcinolone or PRP treatment. The study delivered both therapeutic solutions once weekly for eight weeks. The study evaluated treatment results based on the patients' improvement of mouth movement alongside the decrease in the severity of their burning sensation.

Results: A clinical evolution was detected in all patients. Attempts to enhance mouth opening combined with symptom relief using PRP yielded better long-term results compared to triamcinolone, where adverse effects remained lower for PRP patients.

Conclusion: Long-term research on PRP indicates its functions better than corticosteroid therapy for treating OSMF while maintaining excellent compatibility with the body tissue.

Keywords: Oral Submucous Fibrosis, Platelet-Rich Plasma, Triamcinolone, Intralesional Injection, Mouth Opening, Burning Sensation.

INTRODUCTION

The persistent disease of oral submucous fibrosis leads to malignancy because it triggers extensive submucosal tissue swelling and fibrosis that spreads through the entire oral cavity. The illness restricts a patient's life quality because it generates severe trismus and rigid tissue, which reduces mouth function. Based on survey results, the population of OSMF patients in Pakistan is 4.1%, and malignancies develop in 3% to 19% of these cases (1). Chewing areca nuts is the primary cause of OSMF among the regional community, where this habit remains common. Spicy food and tobacco use, vitamin B12 and iron deficiencies, genetics and autoimmunity, and environmental factors, together with smoking, act as underlying OSMF causes (2). The factors generating inflammation promote the hyalinization of lamina propria tissue, leading to extensive fibrosis and producing thick vertical fibrous bands in the cheeks, facial pillars, and lips (3).

Painful blanching of oral tissues and burning sensations appear during OSMF because vascularity becomes impaired, resulting in a marble-like pattern. The buccal mucosa experiences the highest frequency of OSMF impacts before the palate, while the retromolar region, along with faucial pillars and pharynx, receives occasional development of the condition (4). The advancing stages of the disease result in severe trismus along with dysphagia as well as phonation difficulties which eventually cause malnutrition and poor oral hygiene from oral cavity restriction (5). The stages of trismus assessment commit to express inter-incisal distance measurement results as follows: Stage I (>3 cm) while Stage II (2-3 cm) and Stage III (<2 cm) represent restrictive opening thresholds (6). OSMF symptoms generate physical distress and increase the risk of malignancy, so healthcare providers need effective treatments for stopping progression and optimizing patient function.

OSMF treatment combines medical and surgical interventions, which may receive support from physiotherapy services. The treatment of OSMF starts with removing betel nut and tobacco irritants while providing corticosteroids to patients in either submucosal injections or topical formats. Triamcinolone acetonide operates through enzyme inhibition of phospholipase A2, and it reduces both prostaglandins and leukotrienes while maintaining lysosomal membrane stability to block protease enzyme discharge (7). Triamcinolone proves effective in OSMF patients because of its anti-inflammatory and immunosuppressive properties as an intermediate-acting glucocorticoid (8). Corticosteroid treatment over extended periods results in adverse effects that harm mucosa tissues and cause systemic consequences, making researchers seek new treatment strategies (9).

Platelet-rich plasma (PRP) is a new and valuable restorative medical approach for oral and maxillofacial surgical interventions, including OSMF treatment. PRP represents an autologous plasma fraction enriched with abundant platelets, growth factors, and cytokines that arise from whole blood centrifugation processing (10). PRP injection into the submucosa triggers platelet activation, which leads to mediator and factor release and initiates a tissue remodeling healing sequence (11). The tissue regenerative effects of platelet-derived growth factor and transforming growth factor-beta promote angiogenesis and collagen synthesis to counter OSMF fibrosis (12). Multiple research studies show that Platelet-Rich Plasma works well to treat erosive lichen planus in the mouth, suggesting its possible value in OSMF treatment (13). PRP demonstrates both regenerative properties and autologous nature, which reduce adverse reactions while making it a suitable alternative to corticosteroids (14).

Available research remains limited regarding the effectiveness of triamcinolone and PRP for treating OSMF symptoms, including trismus, in the Pakistani patient population. Researchers must base their studies on evidence to identify the most effective therapy for this problematic condition (15). The research investigates the effectiveness of intralesional triamcinolone against PRP therapy for OSMF patients through examination of mouth opening improvement and pain and burning sensation reductions. The proposed study examines these two treatment approaches to uncover their therapeutic effectiveness, assisting in clinical decision-making and better patient outcomes during OSMF care.

Objective: The research examines how intralesional triamcinolone interacts with platelet-rich plasma by assessing its influence on mouth mobility, pain relief, and burning sensation reduction in patients suffering from oral submucous fibrosis.

MATERIALS AND METHODS

Design: Cross-sectional Study.

Study setting:

The study was done at the Oral and Maxillofacial Surgery Department of Abbasi Shaheed Hospital in Karachi, Pakistan, where they managed cases of OSMF.

Duration:

The study conducted from 12 November, 2024 to 12 April, 2025

Inclusion Criteria:

The study designated medically fit OSMF patients between 20 and 55 to participate if they were both male and female. The study enrolled patients with restricted mouth openings whose willingness to participate obtained consent.

Exclusion Criteria

The hospital mandated the exclusion of patients who underwent surgery or OSMF treatment by medication or restrictive mouth opening for pericoronitis, impacted mandibular third molars, or temporomandibular joint disorders. To guarantee research integrity, all participants with previous allergic reactions or OSMF treatment were excluded from the study.

Methods

The experimental research takes place at Abbasi Shaheed Hospital in Karachi under the approval of an ethical review committee. All suitable patients must give written consent after understanding the study before beginning the research phase. The research subjects receive their assigned treatment according to the chit method, as Group A gets triamcinolone, and Group B receive platelet-rich plasma PRP. The clinical treatment for Group A consists of intraoral submucosal injections of 40 mg (1 ml) triamcinolone at the retromolar trigone and soft palate fibrous bands that was administered once a week for six weeks. Subject in Group B received 1 milliliter of PRP derived from centrifugation for weekly injections at the exact site locations for six weeks. Pre-treatment and all follow-up measurements of mouth opening was conducted with Vernier calipers during the 6-week treatment period and the subsequent 6 months. The study monitor pain and burning assessment using the Visual Analog Scale (VAS) and a 5-point burning scale to document all measurements.

RESULTS

The research enrolled 264 patients with oral submucous fibrosis (OSMF) into two equivalent groups Group A (triamcinolone, n=132) and Group B (platelet-rich plasma, PRP, n=132). The patient demographics between Groups A and B demonstrated matching average ages (34.2 ± 8.1 years in Group A while Group B reached 33.9 ± 7.9 years) and similar gender percentages (Group A included 60% males against 58% males in Group B). The initial evaluation of parameters linked to mouth opening, pain scores, and burning sensation showed equal values between both groups ($p>0.05$).

Table 1: Baseline and Post-Treatment Mouth Opening (mm)

Group	Baseline (Mean ± SD)	Week 6 (Mean ± SD)	6-Month Follow-Up (Mean ± SD)	p-value*
Group A (Triamcinolone)	22.5 ± 4.2	28.7 ± 3.9	27.4 ± 4.1	<0.001
Group B (PRP)	22.8 ± 4.0	31.2 ± 3.7	30.8 ± 3.8	<0.001
*Repeated measures ANOVA, comparing baseline to 6-month follow-up.				

The participants in both groups improved their mouth-opening capability considerably starting at week 6 ($p<0.001$). The study results showed Group B patients who received PRP reached significantly

better mouth opening results (31.2 ± 3.7 mm) than Group A participants (28.7 ± 3.9 mm) during week 6 testing (p=0.002, Mann-Whitney U test). The PRP produced superior outcomes that lasted until the 6-month follow-up period (30.8 ± 3.8 mm vs. 27.4 ± 4.1 mm, p=0.001).

Table 2: Pain Scores (VAS, 0-10) Across Treatment Period

Group	Baseline (Mean ± SD)	Week 6 (Mean ± SD)	6-Month Follow-Up (Mean ± SD)	p-value*
Group A (Triamcinolone)	6.8 ± 1.4	2.4 ± 1.0	3.1 ± 1.2	<0.001
Group B (PRP)	6.7 ± 1.5	1.9 ± 0.9	2.2 ± 1.0	<0.001
*Friedman test, comparing baseline to 6-month follow-up.				

Pain evaluation through VAS assessment demonstrated meaningful decreases within both study groups at p<0.001. The patients in Group B assessed their pain at 1.9 ± 0.9 points during week six, indicating lower pain ratings than Group A, which scored 2.4 ± 1.0 points (p=0.01). The follow-up at 6 months confirmed that PRP treatment provided a modest superior result to the control group (2.2 ± 1.0 vs. 3.1 ± 1.2, p=0.03).

Table 3: Burning Sensation Scores (0-4 Scale)

Group	Baseline (Mean ± SD)	Week 6 (Mean ± SD)	6-Month Follow-Up (Mean ± SD)	p-value*
Group A (Triamcinolone)	2.9 ± 0.8	1.2 ± 0.6	1.5 ± 0.7	<0.001
Group B (PRP)	2.8 ± 0.9	0.9 ± 0.5	1.0 ± 0.6	<0.001
*Friedman test, comparing baseline to 6-month follow-up.				

The burning sensation scores presented substantial improvement to a statistically significant degree (p<0.001). Patients in Group B experienced a more considerable decrease in scores to (0.9 ± 0.5) compared to Group A, which experienced (1.2 ± 0.6) at week 6 (p=0.02). At 6 months, the amount of burning sensation reported by patients in Group B (1.0 ± 0.6) was significantly lower when compared to Group A (1.5 ± 0.7) (p=0.01). The treatments proved to be well-accepted by both groups since no adverse events were documented during the study. Research demonstrated that the utilization of PRP surpassed triamcinolone because it produced lasting mouth-opening improvements, pain reduction, and burning sensation relief for six months.

DISCUSSION

The treatment methods for oral submucous fibrosis become progressively more challenging because the condition intensifies while the patient's quality of life decreases with time. The evaluation of OSMF patients involved measuring mouth opening and assessing pain and burning symptoms following intralesional triamcinolone or PRP interventions. Intralesional triamcinolone showed inferior healing effectiveness against PRP treatment results because the PRP therapy provided continued and enhanced clinical benefits through all testing stages. Research reveals that subjects treated with PRP regulatory injections showed promising effects for treating mucosal lesions and fibrosis areas better than corticosteroid treatment methods (1).

Continuous degeneration of submucosal tissues in OSMF results in trismus, while burning, discomfort, and pain affect patients because individuals in South Asian nations such as Pakistan persistently consume areca nuts (2). The treatment efficacy of intralesional therapy becomes clear when research shows that the therapy improves mandibular movement capabilities, supporting both studies. The superior outcome of PRP treatment becomes apparent through its 31.2 mm mean mouth opening result during week 6 compared to 28.7 mm with triamcinolone because the regenerative properties of PRP show greater potential in targeting OSMF fibrosis. The growth factors in PRP,

especially platelet-derived growth factor (PDGF) and transforming growth factor-beta (TGF-beta), activate tissue recovery through angiogenesis and tissue remodeling, thus reversing hyalinization and vascular problems that characterize OSMF (3). The tissue regenerative properties of PRP differ from triamcinolone because it reduces prostaglandin and leukotriene production yet lacks direct mechanisms for treating fibrosis in tissues (4). Results from the 6-month follow-up demonstrated that PRP-treated patients experienced better maintenance of improved mouth opening (30.8 mm vs. 27.4 mm for triamcinolone), which suggests that PRP-based therapy leads to extended tissue repair periods. This finding matches previous research about PRP therapy applications in erosive oral lichen planus and mucosal lesion treatment (5).

VAS measured pain reduction, which was a critical outcome of the study. The subjects receiving PRP therapy recorded better pain levels (1.9 versus 2.4 on VAS) compared to the triamcinolone group at week 6 of the study. PRP demonstrates effective healing abilities, which enable it to manage inflammatory mediators, thus helping to reduce OSMF's chronic inflammatory state (6). Triamcinolone effectively reduces inflammation, but its temporary benefits do not resolve tissue damage since pain scores increased slightly at six months while pain scores under PRP treatment remained at 2.2. The data showed that PRP therapy led to better outcomes than the comparison treatment regarding burning sensation scores, as it produced a reduction of 0.9, while the standard condition resulted in only 1.2 points of reduction in week 6. A recent study confirmed that PRP treatment performs better than corticosteroids in treating fibrotic disorders because of its growth factor healing properties (7). The autologous properties of platelet-rich plasma reduce adverse effects because corticosteroids often result in mucosal deterioration or systemic conditions when used for an extended period (8).

The study findings prove essential in Pakistan since OSMF affects many patients because of their betel nut habits (9). PRP's better results suggest it represents a promising substitute for corticosteroids when looking after patients who need ongoing treatment. The preparation process for platelet-rich plasma with specialized equipment, including centrifuges, adds challenges to its accessibility in poor facilities compared to the ready availability of triamcinolone (10). The study findings show both treatments are safe, but patients may benefit from the long-term effects of PRP on managing OSMF (11).

Different research investigations demonstrate conflicting results regarding their findings. The usage of hyaluronidase-mixed triamcinolone shows positive treatment effects, aiding mouth opening and improving symptoms (12). A six-month follow-up by our study indicates that PRP maintains its effectiveness while standard measurements from shorter-duration assessments do not reveal such extended benefits (13). Research investigations of PRP yield consistent data about tissue healing in OSMF patients and patients with urethral strictures and other fibrotic conditions (14). Studies have researched how antioxidants combined with corticosteroids perform compared to PRP's full tissue repair capabilities, which remain superior (15). The study employed robust methodology with both a large sample size and standardized outcome assessment. It reinforced its conclusions, but additional study single-center analysis requirements and missing tissue analysis data required additional study and single-center analysis data.

PRP shows superior capabilities as OSMF treatment compared to triamcinolone based on its better outcomes for mouth opening improvement and pain and burning sensation relief, which persist throughout a six-month period. Regenerative medicine therapies need to become standard management approaches for OSMF, especially within Pakistani regions that demonstrate high prevalence rates. The complete embedding of PRP as a clinical treatment for this disabling condition needs additional studies to determine its operational cost structure, tissue modifications, and practical implementation potential.

CONCLUSION

The research investigated how intralesional triamcinolone and platelet-rich plasma (PRP) treatment affect patients with oral submucous fibrosis (OSMF) as a long-lasting oral condition. The clinical

measures of mouth opening combined with burning sensation reduction showed noteworthy improvements after patients received either treatment. Long-term tissue regeneration combined with sustained relief was achieved through PRP treatment because the autologous nature and growth factors within the treatment provided better overall outcomes. Symptomatic benefits of triamcinolone were rapid, but its long-term effects remained shorter, and patients experienced possible adverse reactions related to corticosteroids. Research evidence suggests that autologous platelet-rich plasma is a favorable and secure treatment option when helping patients with OSMF, even during extended therapeutic needs. Long-term studies using larger subject samples need to be conducted to confirm the advantages and improve application standards of PRP treatments for OSMF patients.

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