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EDITORIAL

Dr. Rekha Jagadish
Editor in Chief
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Greetings to all.

" *Gaining Knowledge,*
is the first step to wisdom
Sharing it,
is the first step to humanity."

Medical conferences play a vital role in advancing healthcare by providing a platform for continuing medical education, professional development and the dissemination of cutting-edge research. They allow health care professionals to stay updated with the latest clinical guidelines, treatment protocols and technical innovations ensuring high standards of patient care. Furthermore, medical conferences serve as important venues for presenting new research findings, receiving peer feedback and influencing healthcare policy. By combining education, innovation and collaboration, medical conferences significantly contribute to the progress of medical science and the global improvement of health system.

So, we are pleased to release third issue of Bangalore Dental Journal, 2025 on the occasion of dentist's convention on 30th August 2025 at government dental college and hospital, Bangalore.

I appreciate the support of office bearers, IDA members, reviewers and contributors for this journal and I look forward for the same in future.

With Regards,
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2025

IDA Bangalore Branch

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PRESIDENT 'S MESSAGE

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Greetings to all

"Every smile is a work of art, and every tooth, a testament to our commitment to excellence."

It is with great pride and enthusiasm that I present this inaugural message in our IDA Bangalore Branch Journal. As I step into the role of President, I am excited to embrace the challenges and opportunities that lie ahead, and I am deeply committed to advancing our shared vision of excellence in dentistry.

Our association has long been a beacon of innovation and collaboration, fostering an environment where dental professionals can thrive, learn, and contribute to the broader dental community. This journal stands as a testament to our commitment to knowledge-sharing and academic excellence. It serves not only as a platform for the latest research and clinical advancements but also as a forum for insightful discussions and the exchange of ideas that drive our profession forward.

In this era of rapid technological and scientific progress, our focus remains on elevating patient care and advancing the standards of dental practice. Through continuing education initiatives, groundbreaking research, and community outreach, we are dedicated to nurturing the next generation of dental professionals and ensuring that our field remains at the forefront of healthcare innovation.

I extend my heartfelt gratitude to all members, contributors, and our editorial team for their unwavering support and commitment. Together, let us build on our rich legacy, celebrate our achievements, and pave the way for a future marked by excellence and transformative progress.

SECRETARY 'S MESSAGE

Dr. Shivu M E
Hon. Secretary
IDA Bangalore Branch

Warm Greetings!

It is my pleasure to introduce this first issue of IDA Bengaluru branch for the year 2025.

As Secretary I am delighted to see the high-quality research and insights that our members and contributors have shared with the community.

This journal is a testament to the dedication and expertise of our members, who have worked tirelessly to advance the field of modern dentistry. The articles in this issue showcase the latest developments, trends, and innovations in our field,and provide a valuable resource for scholars, practitioners, and policymakers.

I would like to extend my gratitude to the authors, reviewers, and editors who have contributed to this issue. Your hard work and commitment to excellence have made this journal a valuable asset to our community.

I hope that this issue will inspire and inform readers, and contribute to the ongoing conversation in our field. I look forward to seeing the impact that this journal will have on our field and the broader community.

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From Mouth to Movement : Examining the Connections between Dentistry, Diabetes and Exercise: A Review

AUTHORS : **Dr Divya Rani P**

Assistant Professor, Department of Prosthodontics and Crown and Bridge, Vokkaligara Sangha Dental College and Hospital, Bengaluru.

INTRODUCTION

The intricate interconnection among dentistry, diabetes, and exercise underscores the holistic nature of healthcare. Specifically, Type 2 Diabetes Mellitus is linked to an elevated susceptibility to oral health complications, particularly periodontal disease.[1] The chronic inflammatory state associated with diabetes can exacerbate gum issues, highlighting the crucial need for vigilant oral care.[1,2] Simultaneously, regular exercise emerges as a pivotal lifestyle intervention in the management of diabetes, exerting positive effects on glycemic control and overall health.[3] The interplay between exercise and oral health in diabetes is multifaceted; physical activity has the potential to contribute to improved blood sugar regulation and mitigate oral health risks.[4]

In the realm of dentistry, recognizing the unique challenges confronted by individuals with diabetes is paramount. Dental professionals play a vital role in enlightening patients about the reciprocal relationship between oral health and diabetes, underscoring the significance of maintaining consistent oral hygiene practices.[2] Additionally, the promotion of an active lifestyle, incorporating regular exercise, is increasingly emphasized in the comprehensive care of diabetes.[3] Integrating dental care into the broader framework of diabetes management emphasizes the synergy between lifestyle choices, systemic health, and oral well-being.[4]

Ultimately, adopting a collaborative approach that intertwines dentistry, diabetes management, and exercise fosters overall health and empowers individuals to proactively address the interconnected aspects of their well-being.

DIABETES AND ORAL HEALTH :

Tooth Preparation

Diabetes is a chronic metabolic disorder characterized by increased levels of blood glucose. There is a significant increase in the number of diabetes cases across all countries over the past thirty years. The World Health Organisation (WHO) estimates that there are about 422 million people with diabetes across the globe.[5] Latest release from the Ministry of Health and Family Welfare of India, dated 01st August 2023 it is mentioned that the prevalence is about 10.1 crore (~101 million) in the country.[6]

Diabetes often brings oral manifestations that notably impact dental care. The increasing concern lies in the potential of these oral issues to significantly affect diabetes' metabolic control. Recognizing this connection is crucial for comprehensive patient care.[1] A study observed that over 90% of individuals with diabetes experienced oral complications.[8] Some of the oral health complications of diabetes mellitus include tongue abnormalities, oral infections, delayed wound healing, dental caries, taste abnormalities,

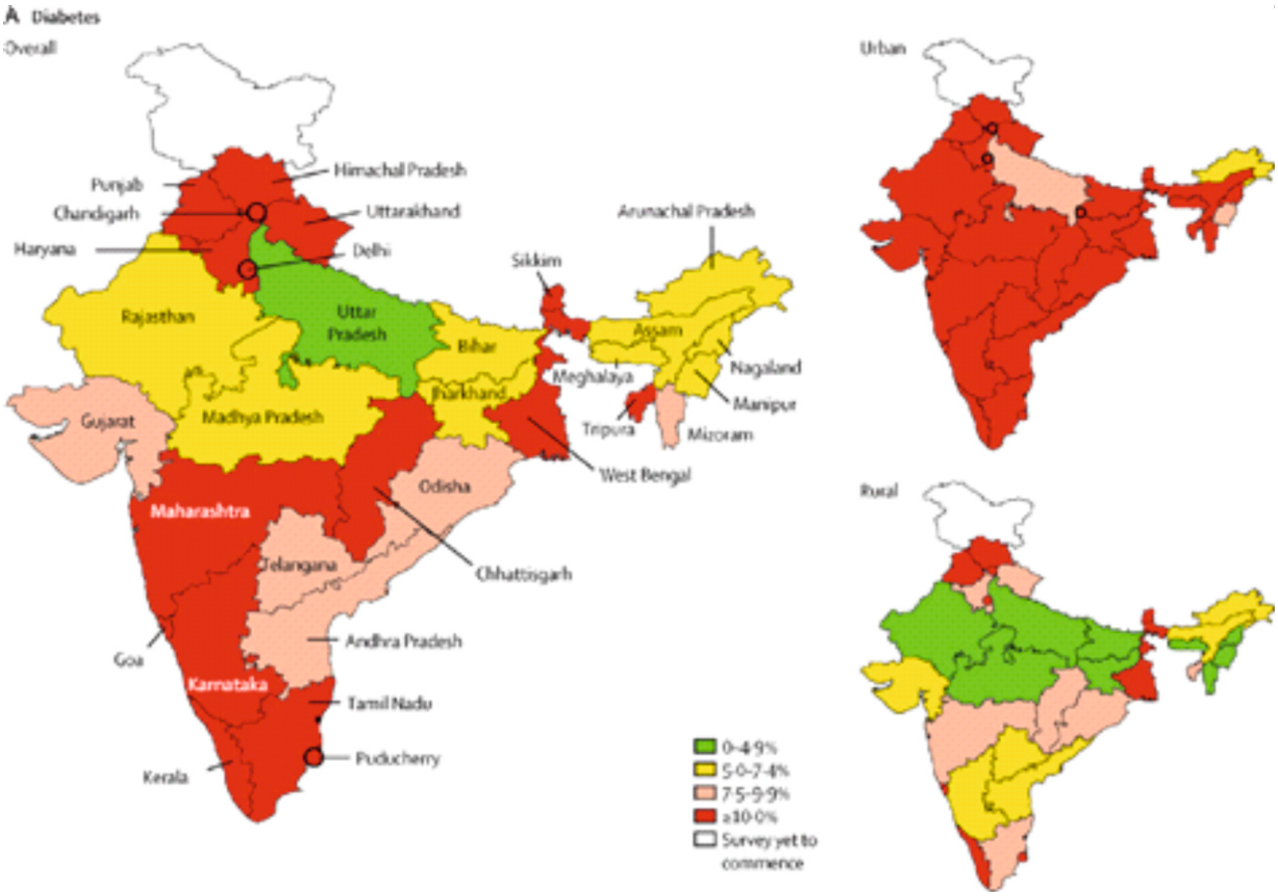

Figure 1: State wise weighted prevalence of diabetes in India (7)

(Adapted from: Ranjit Mohan Anjana et al., Metabolic non-communicable disease health report of India: the ICMR-INDIAB national cross-sectional study (ICMR-INDIAB-17. VOLUME 11, ISSUE 7, P474-489, JULY 2023) https://www.thelancet.com/journals/landia/article/PIIS2213-8587(23)00119-5/fulltext)

oral lichen planus, salivary dysfunction, halitosis, gingivitis and perio-dontitis.[2]

Evidence has shown that there is a bi-directional relationship between diabetes and periodontitis. While periodontitis is one of the key complications diabetes, data also suggests the vice-versa, effective management of either of the two diseases results in mutual benefits.[9,10] Despite a robust body of evidence supporting the link between Type 2 Diabetes Mellitus (T2DM) and oral health, there is a notable deficiency in oral health awareness among diabetes patients.[1]

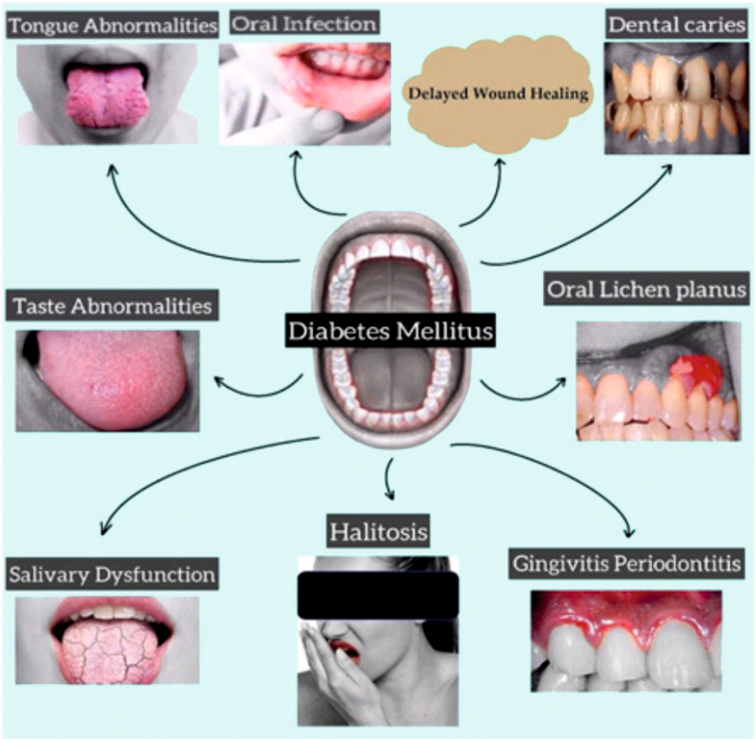

Figure 2: Oral Complications of Diabetes Mellitus [2] (Adapted from: Ahmad R, Haque M. OralHealthMessiers:Diabetes Mellitus Relevance. Diabetes Metab SyndrObes.2021Jul 1;14:3001-3015.)

Diabetes and Exercise

Data suggests that the more one engages in physical activity, the lower the likelihood of developing T2DM. Also, in the realm of diabetes management, diet and exercise (lifestyle modification) stand out as foundational components according to consensus in clinical guidelines. The positive impact of exercise on glucose disposal and insulin action positions it as an effective tool for aiding in glucose regulation. [11])

A joint position statement by American College of Sports Medicine and American Diabetes Association states clearly the imperative of physical activity as a key part of diabetes prevention and clinical management. [12]

Exercise is pivotal in preventing and controlling insulin resistance, prediabetes, gestational diabetes, type 1 diabetes, type 2 diabetes, and related complications, including the oral health complications. Both aerobic and resistance training acutely enhance insulin action, positively impacting blood glucose, lipids, blood pressure, cardiovascular risk, mortality, and quality of life. Consistent, varied training is key for ongoing benefits. With precautions, individuals with type 2 diabetes can safely engage in exercise, making it essential for optimal health.[4,11-13]

Exercise, Diabetes and Oral Health

We have elaborated above about the relationship between diabetes and oral health, also between exercise and diabetes mellitus, establishing the triple linkage should not be a difficult task.

Data from a randomized control trial indicated that in patients with T2DM, a physical activity (sports) intervention lasting at least 6 months exhibited a marked positive effect on periodontal health and HbA1c concentrations when compared to a control group without the intervention.[14] It was found through a meta-analysis that regular physical activity led to a 23% risk reduction of periodontitis.[15]

Physical activity has the potential to positively influence periodontitis by directly reducing inflammatory biomarkers and indirectly affecting insulin sensitivity, obesity, bone density, stress, and other health-promoting behaviors. The essential role of managing risk factors in initial periodontal therapy underscores the significance of recognizing physical activity as a potential behavioral risk modifier. Evidence suggests that in the treatment and prevention of type 2 diabetes, physical exercise, combined with nutritional counseling, serves as a fundamental pillar. Moreover, it has the capacity to decrease the incidence of both periodontal disease and cardiovascular risk.[16,17]

CONCLUSION

Dental professionals must explicitly advise exercise and lifestyle changes, particularly for those with Type 2 Diabetes Mellitus, recognizing the intricate link between oral health and overall well-being. Regular exercise is pivotal in diabetes management, positively impacting glycemic control and overall health. Emphasizing the importance of physical activity alongside oral hygiene practices contributes comprehensively to patient well-being.

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From Striae to Stability: Therapeutic Success in Oral Lichen Planus with Corticosteroids: A Case Series

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Department of Oral Medicine and Radiology, Seema Dental College and Hospital Rishikesh, Uttarakhand..

ABSTRACT:

Background: Oral lichen planus (OLP) is a chronic, immune-mediated mucocutaneous disorder with diverse clinical manifestations, predominantly affecting the buccal mucosa. Given its persistent nature, potential for malignant transformation, and detrimental effect on patients' quality of life, precise diagnosis and effective therapeutic strategies are imperative.

Objective: This case series aims to describe the clinical presentation and therapeutic outcomes in two adult male patients diagnosed with symptomatic OLP, with a focus on their response to corticosteroid therapy. Methods: Two male patients presented with a persistent burning sensation localized to the buccal mucosa. Comprehensive clinical evaluation and documentation of therapeutic response were undertaken. Management involved corticosteroid regimens individualized according to the severity and extent of clinical lesions.

Results: Both patients demonstrated marked symptomatic relief and notable clinical improvement within one week of initiating corticosteroid therapy, without any reported adverse effects.

Conclusion: Corticosteroids continue to represent the cornerstone of treatment for symptomatic OLP. Timely diagnosis, personalized therapeutic approaches, and regular follow-up are essential to optimize clinical outcomes and mitigate the risk of disease progression or malignant transformation.

Keywords: Oral Lichen Planus, Corticosteroids, Burning Sensation, Buccal Mucosa, Autoimmune, Triamcinolone, Betamethasone.

INTRODUCTION

Oral lichen planus (OLP) is a chronic, immune-mediated inflammatory disorder affecting the mucocutaneous tissues. Initially described by Erasmus Wilson in 1869, OLP is now classified as an oral potentially malignant disorder (OPMD), with a reported malignant transformation rate ranging from 0.4% to 3.7%, varying by clinical subtype and population demographics.[1]

The precise etiology of OLP remains incompletely understood, although it is believed to result from a multifactorial interplay involving genetic predisposition, immune dysregulation, environmental exposures, and psychosocial stressors.[2] Immunopathologically, the condition is characterized by the activation of cytotoxic $CD8^+$ T-lymphocytes, which mediate apoptosis of basal keratinocytes, culminating in basal cell layer degeneration and chronic subepithelial inflammation.[3]

Clinically, OLP most commonly affects middle-aged adults and exhibits a slight female predominance. Lesions typically present bilaterally

and symmetrically, with the buccal mucosa, tongue, and gingiva being the most frequently involved sites[4] Multiple clinical variants have been described, including: Reticular: The most prevalent form, usually asymptomatic, presenting as interlacing white striae (Wickham's striae), Erosive: A symptomatic form characterized by erythema, ulceration, and associated burning or pain Others: Atrophic, papular, plaque-like, and bullous variants, which occur less commonly[5]

The therapeutic approach to OLP remains largely symptomatic, aiming to reduce mucosal inflammation and alleviate discomfort. Topical corticosteroids are the mainstay of treatment, with commonly used agents including triamcinolone acetonide and betamethasone. In cases that are unresponsive to topical therapy, systemic corticosteroids, calcineurin inhibitors (e.g., tacrolimus), or other immunomodulatory agents may be indicated.[6,7]

This case series presents the clinical profiles, diagnostic considerations, and therapeutic outcomes of two patients with symptomatic OLP who were managed at a tertiary care dental institution using topical corticosteroid therapy.

2. CASE REPORTS

2.1 Case 1

Patient Information

A 65-year-old male presented to the Department of Oral Medicine and Radiology, Seema Dental College and Hospital, Rishikesh, with a primary complaint of a burning sensation localised to the right buccal mucosa, persisting for a year. The severity of discomfort was reported as 7/10 on the Visual Analogue Scale (VAS). The symptom was intermittent, aggravated by the intake of hot and spicy foods, and alleviated by bland dietary choices. The patient denied any history of ulceration, bleeding, or cutaneous manifestations and reported no previous dental interventions. A review of systems was non-contributory, with no complaints of fever, weight loss, fatigue, dermatological involvement, or other systemic symptoms.

Clinical Findings

Intraoral examination revealed a diffuse erythematous patch on the right buccal mucosa in relation to teeth 45 and 46, measuring approximately 1.0 × 0.5 cm. The lesion was non-tender, non-scrapable, and showed no evidence of ulceration or the characteristic white striae (Figure 1). No perioral or facial skin lesions suggestive of cutaneous lichen planus (e.g., violaceous papules or plaques) were observed. Examination of the scalp, limbs, and nails did not reveal any characteristic lesions. No cervical lymphadenopathy or extraoral abnormalities were observed.

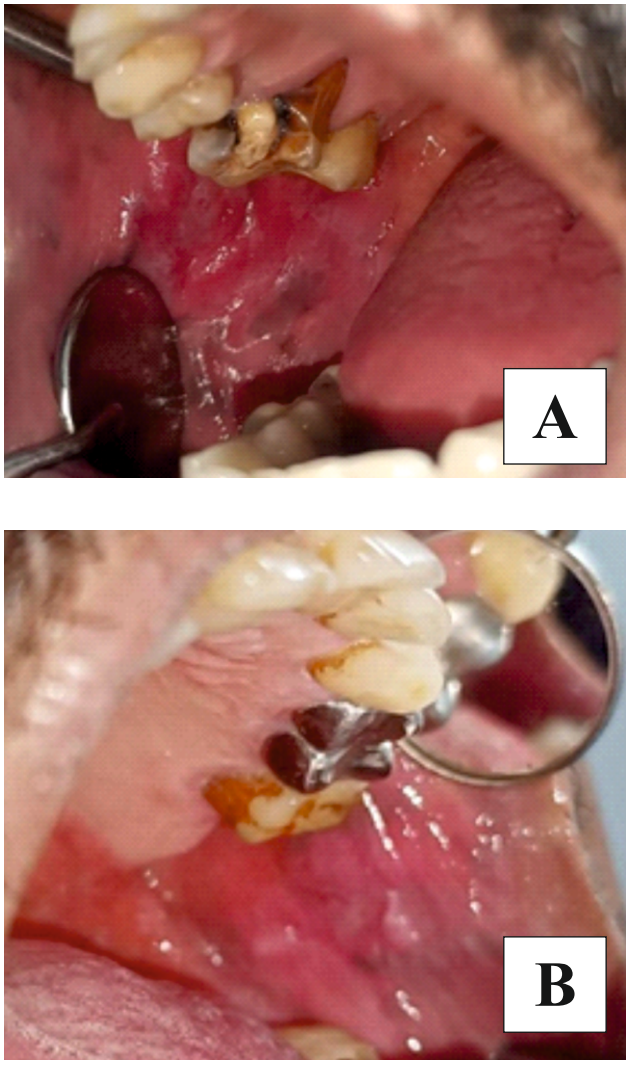

Figure 1: A- Right Buccal Mucosa, B- Left Buccal Mucosa

Diagnostic Assessment

The clinical findings were consistent with the erosive variant of OLP, which is often symptomatic and known to present with mucosal atrophy and erythema, particularly in middle- aged and elderly individuals. Given the absence of other mucocutaneous involvement, a systemic disorder or lichenoid drug reaction was considered less likely at this stage.

Therapeutic Intervention

The patient was initiated on a corticosteroid-based therapeutic regimen comprising systemic and topical agents. Prednisolone 10 mg was prescribed thrice daily for 4 days with a tapering schedule over a two-week period. In addition, the patient was advised to use a 0.5 mg betamethasone mouthwash (swish & spit) three times daily following meals and to apply triamcinolone acetonide 0.1% paste topically to the affected area three times per day. This combination aimed to reduce mucosal inflammation, alleviate symptoms, and promote mucosal healing.

Follow-up and Outcomes

The patient was reviewed after one week and reported a marked reduction in burning sensation, with the Visual Analogue Scale (VAS) score improving from 7/10 to 3/10. Clinical examination revealed a notable decrease in erythema, and the affected mucosa appeared healthier with signs of healing. The patient was advised to continue with the tapering corticosteroid regimen and was counselled on maintaining meticulous oral hygiene to support ongoing recovery and prevent recurrence

Figure 2: One Week Folow-up

2.2 CASE 2

Patient Information

A 60-year-old male reported to the Department of Oral Medicine and Radiology with a longstanding complaint of burning sensation involving both buccal mucosae and the gingival tissues, persisting for the past two years. The severity of the discomfort was rated as 8/10 on the Visual Analogue Scale (VAS). The burning was described as intermittent in nature and was consistently aggravated by the consumption of spicy or acidic foods, significantly impacting his dietary comfort and quality of life.

The patient had previously consulted multiple physicians and dental professionals over the course of his symptoms; however, he had not attained sustained relief from any prior therapeutic interventions. There was no history of previous corticosteroid therapy or definitive diagnosis. A detailed and systematic review of systems revealed no significant abnormalities. The patient denied h/o fever, weight loss, or fatigue. There were no gastrointestinal disturbances, dermatologic lesions, neurologic symptoms, genitourinary complaints, or signs suggestive of systemic disease. The patient's medical, surgical, drug, and family histories were non-contributory, and no known allergies were reported.

Clinical Findings.

Intraoral examination revealed linear white patch

on the right buccal mucosa wrt. 46 and 47, surrounded by an area of erythematous mucosa. Comparable lesions with surrounding erythema were noted on the left buccal mucosa wrt. 36 and 37. Additionally, marginal and interdental gingiva involvement was observed in the anterior and posterior segments, specifically wrt. 13–17, 23–27, and 33–37 (Figure 3). The lesions were tender, non-scrapable on palpation, and exhibited a smooth surface texture.

The patient exhibited no facial asymmetry, swelling, or tenderness. Inspection of the skin revealed no violaceous, polygonal, flat-topped papules typically associated with cutaneous lichen planus. The scalp, flexor surfaces of the wrists, forearms, legs, and ankles were examined and found to be free of lesions. Nail examination showed no evidence of longitudinal ridging, pterygium formation, or nail dystrophy.

Diagnostic Assessment

Based on the clinical presentation—characterised by bilateral white striae interspersed with erythematous and tender areas involving the buccal mucosa and marginal gingiva—a diagnosis of reticular-erosive oral lichen planus (OLP) was established. The coexistence of asymptomatic reticular patterns with symptomatic erosive components supported this mixed clinical variant.

Therapeutic Intervention

The patient was prescribed a combination corticosteroid regimen aimed at reducing mucosal inflammation and alleviating symptoms. This included oral prednisolone 10 mg, administered three times daily for 4 days with a tapering schedule over two weeks. Additionally, triamcinolone acetonide 0.1% was advised for topical application to affected sites three times daily, and betamethasone sodium phosphate (0.5 mg/5 mL) mouth rinse (swish & spit) was prescribed for use after meals, three times daily. The patient was also counselled on adherence to the regimen and the importance of maintaining optimal oral hygiene.

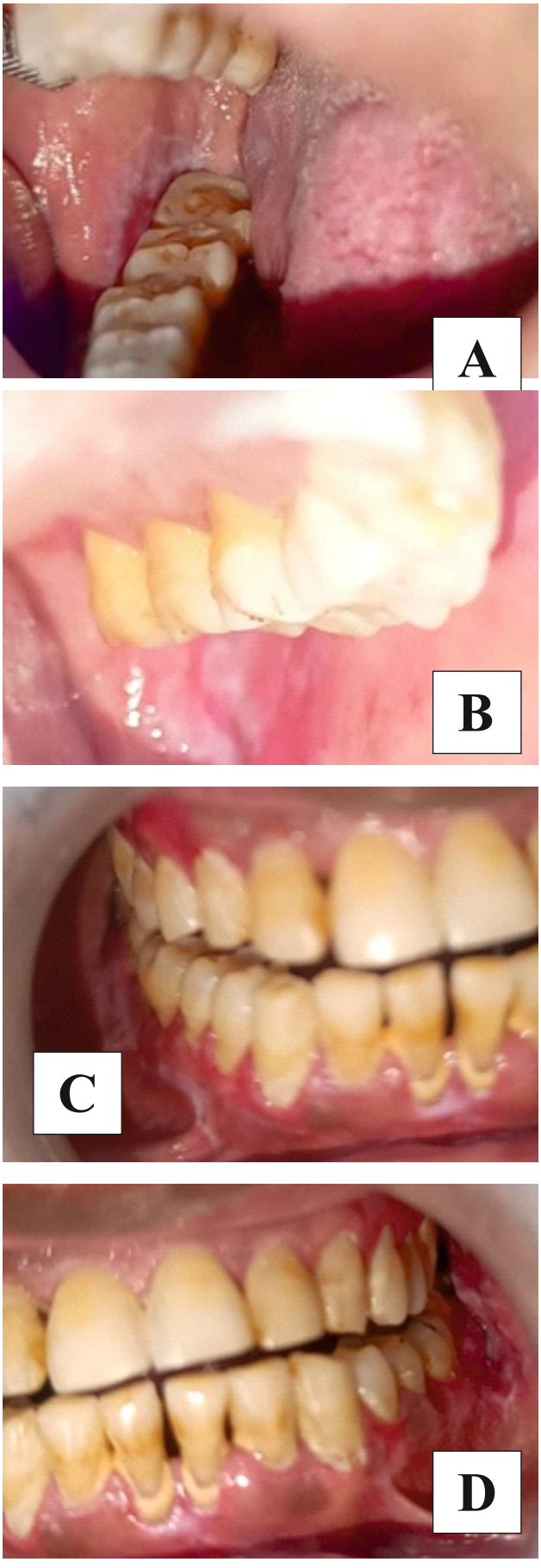

Figure 3: A- Right Buccal Mucosa, B- Left Buccal Mucosa, C- Gingiva

Follow-up and Outcomes

At the two-week follow-up, the patient reported substantial symptomatic improvement, with the Visual Analogue Scale (VAS) score decreasing from 8/10 to 2/10. Clinical examination revealed a marked reduction in erythema and improved mucosal appearance. In light of the favourable response, the patient advised a long-term maintenance protocol involving continued topical therapy as needed, reinforcement of oral hygiene practices, and scheduled periodic reviews to monitor for recurrence, progression, or potential complications.

Figure 4: 2 Week Folow-up

3. DISCUSSION

Oral lichen planus (OLP) represents a diagnostic and therapeutic challenge owing to its heterogeneous clinical manifestations, chronicity, and recognised potential for malignant transformation.[8] The two cases presented in this series reinforce the efficacy of corticosteroid- based therapy in the management of symptomatic OLP.

The erosive subtype, as illustrated in Case 1, is often painful and requires prompt intervention. Erythema and epithelial thinning contribute to significant discomfort, particularly during mastication and consumption of spicy or acidic foods.[9] In contrast, Case 2 demonstrated a mixed reticular-erosive variant, with bilateral involvement of the buccal mucosa and marginal gingiva. This underscores the importance of a comprehensive intraoral examination and highlights the role of interdisciplinary coordination—especially when periodontal tissues are implicated.[10]

OLP, while primarily affecting the oral mucosa, may also present with mucocutaneous involvement or as part of rare syndromic associations. Cutaneous manifestations, when present, typically appear as violaceous, polygonal, flat-topped papules with fine reticulated white lines, commonly observed on the wrists, forearms, or ankles. Genital involvement may be seen in both genders and is frequently erosive in nature, affecting the vulva, vagina, or glans penis. In such cases, syndromes like vulvovaginal-gingival syndrome (VVGS) or penogingival syndrome may be diagnosed, both of which are characterised by simultaneous erosive lesions in the genital and oral mucosa and are often painful and difficult to manage. Nail changes, including longitudinal ridging, thinning, splitting, and pterygium formation, can also occur. Scalp involvement, known as lichen planopilaris, may result in scarring alopecia. A rare but well-documented variant is the Graham-Little-Piccardi-Lasseur syndrome, presenting as a triad of scarring scalp alopecia, non-scarring hair loss in axillary and pubic regions, and follicular papules on the trunk or extremities. Additionally, several studies have reported an association between OLP and hepatitis C virus (HCV), particularly in specific populations such as those from the Mediterranean region or Japan, suggesting the need for serological screening in selected cases. Furthermore, lichenoid lesions resembling OLP may arise secondary to systemic medications—commonly NSAIDs, beta-blockers, antimalarials, or oral hypoglycaemic agents —necessitating a careful drug history to rule out drug-induced lichenoid reactions. Hence, a comprehensive clinical evaluation including dermatological, genital, and systemic assessment is crucial, especially in cases of widespread, recalcitrant, or atypical OLP presentations.[11]

Although the diagnosis of oral lichen planus is often clinical—based on its characteristic bilateral distribution, presence of Wickham's striae, and chronicity—additional investigations may be warranted in atypical presentations or cases unresponsive to initial therapy.[12] Histopathological examination remains the gold standard for confirmation, typically revealing features such as hyperkeratosis, saw-tooth rete ridges, degeneration of the basal cell layer, and a dense band-like subepithelial lymphocytic infiltrate. Direct immunofluorescence (DIF) can be valuable in distinguishing OLP from other immune-mediated mucocutaneous disorders, with findings such as fibrinogen deposition along the basement membrane zone. In selected cases, routine haematological screening, liver function tests (due to a known association with hepatitis C in some populations), and fasting blood glucose may be considered to rule out systemic associations.[13] In the present case series, the diagnosis was based on classical clinical features and a positive response to corticosteroid therapy, thus histopathology was deemed unnecessary.

Corticosteroids remain the cornerstone of treatment for symptomatic OLP.[4, 7] Triamcinolone acetonide 0.1%, applied topically, is commonly used to suppress local inflammation. In cases of multifocal or diffuse involvement, betamethasone (0.5 mg/mL) mouth rinse provides broader mucosal coverage and symptomatic relief.[6,14]

Topical corticosteroids are generally preferred over systemic therapy due to their localised action and minimal systemic absorption. Nevertheless, successful outcomes rely heavily on patient adherence, correct application technique, and compliance with dosing regimens.[14] Adjunctive measures may include antifungal prophylaxis —such as clotrimazole—in patients undergoing extended corticosteroid therapy, to mitigate the risk of secondary candidiasis. Additionally, psychological counselling, stress management, and consistent follow-up are integral to holistic care.[15]

While many patients exhibit a positive clinical response to conservative therapy, OLP may follow a chronic or relapsing course. Although the overall risk of malignant transformation is low, it is well documented—particularly in the erosive and atrophic variants.[16] Consequently, long-term surveillance incorporating clinical evaluation and photographic documentation is essential to monitor disease progression and identify early signs of dysplastic change.

4. CONCLUSION

Oral lichen planus is a common chronic mucosal disease with significant impact on quality of life. Prompt recognition of symptomatic variants and implementation of a tailored topical corticosteroid regimen can result in substantial symptom relief and improved oral function. Both cases presented in this series demonstrated favourable outcomes with appropriate conservative management. These findings reinforce the need for an individualized, evidence- based, and multidisciplinary approach in the diagnosis and treatment of OLP.

5. SOURCE OF FUNDING

None

6. CONFLICT OF INTEREST

None

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A Clinical Approach to Reconstruct Lost Papillae Using A-PRF and SCTG Using Han & Takei Technique: A Case Report

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INTRODUCTION

The interdental papilla is a critical component in the esthetic zone, contributing to the harmony of the smile, phonetics, and periodontal health. Its absence not only results in the formation of unesthetic "black triangles" but also predisposes patients to phonetic difficulties and food impaction, impacting overall quality of life [1,2]. The loss of papillae may arise due to periodontal disease, interproximal bone loss, tooth morphology, trauma, or natural aging [3]. Reconstruction of the papilla remains one of the most technique-sensitive and challenging procedures in periodontal plastic surgery due to limited vascularization and spatial constraints [4].

Traditional management strategies have revolved around the use of autogenous grafts such as the subepithelial connective tissue graft (SCTG), which has long been considered the gold standard due to its predictable outcomes and high success rate [5–7]. However, advancements in biologics have led to the introduction of platelet concentrates like Advanced Platelet-Rich Fibrin (A-PRF), which offer growth factor-rich matrices to stimulate healing, neovascularization, and tissue regeneration without the morbidity of a secondary donor site [8–10].

This case report presents a clinical comparison between SCTG and A-PRF for papilla reconstruction using Han & Takei's Technique, with outcome assessment via the JEMT Papilla Index [11] and volumetric analysis using Intra Oral Scanning.

CASE -1 (SCTG)

A 33-year-old female patient presented with interdental papilla loss between maxillary anterior teeth 22, 23, categorized as Class I papillary loss as per Nordland and Tarnow's classification [12]. The patient had no active periodontal disease or systemic comorbidities and was not on any medication. The patient was explained about the clinical procedure and its outcome and a written informed consent was obtained.

Surgical procedure -

A partial thickness semilunar incision was placed in the alveolar mucosa facial to the interdental papilla and a pouch like preparation was performed into the interdental area using a microsurgical blade (Han and Takei technique 1996). Intrasulcular incision was made around the mesial and distal half of the two adjacent teeth to free the connective tissue from the root surface to allow coronal displacement of the gingival papillary unit.

A split thickness flap was raised from the semilunar incision towards the crevicular incision in order to completely mobilize the gingiva-papillary unit. The flap was meticulously separated beneath the papilla and advanced into the palatal area without damaging the palatal mucosa. After fully liberating the gingiva-papillary unit, a gentle blunt dissection was performed to detach all connections from the tooth surface, facilitating the coronal displacement of the papilla. Great care was taken to avoid cutting into the interdental papillae [4].

The area established between the papillary unit

and the crestal bone was subsequently filled with subepithelial connective tissue graft obtained from the palate. Subepithelial connective tissue grafts were harvested using the trap door technique[14]. Graft was placed in the prepared pouch and stabilized using suspensory sutures with 4-0 non-resorbable sutures. [15]

Pre Op BASELINE

Post Op 1 MONTH

Post Op 3 MONTH

Post Op 6 MONTH

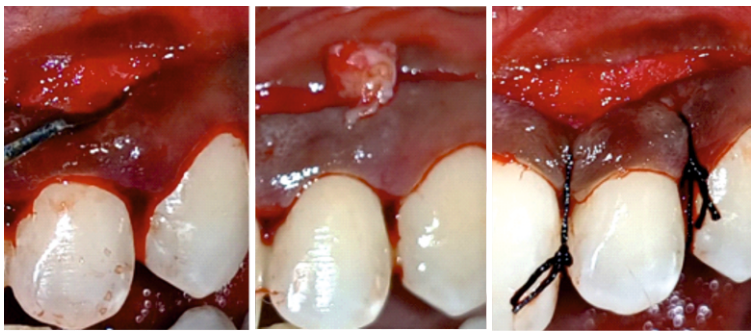

Fig. 1 a) A partial thickness semilunar incision was placed after placing flowable composite below the contact point. ***b)*** Placement of Connective tissue graft in the recipient site wrt., 22 & 23, ***c)*** Placement of suspensory suture

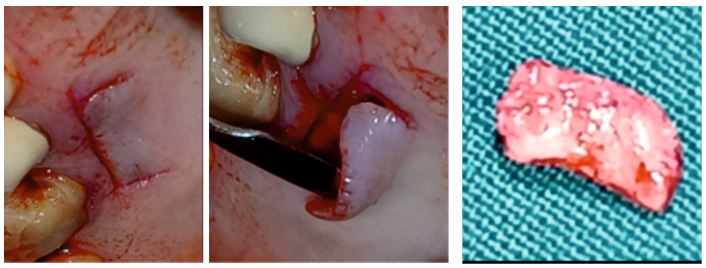

Fig. 2 : Connective tissue graft was procured using Trap door technique

CASE 2 – A-PRF

A 28-year-old male patient presented with interdental papilla loss between maxillary anterior teeth 21, 22, categorized as Class I papillary loss as per Nordland and Tarnow's classification [12]. The patient was not suffering from active periodontal disease and was not medically compromised. The patient was explained about the clinical procedure and its outcome and a written informed consent was obtained.

Surgical procedure - Flowable composite was placed at the contact point before the start of the surgical procedure so as to provide anchorage to the suspensory suture.

The surgical procedure performed was Han and Takei's technique and in the current case, A-PRF was used as an alternative to SCTG. 10 ml of blood was drawn from the patient & centrifuged at 1500 rpm for 14 mins to obtain A-PRF (Ghanaati et al. 2014) [7]. A-PRF membrane was procured by compressing the fibrin clot in the PRF box. The membrane was inserted into the pouch and secured with suspensory sutures. Coe-Pak dressing was applied.

Pre Op BASELINE

Post Op 1 MONTH

Post Op 3 MONTH

Post Op 6 MONTH

Fig. 3 a) Semilunar incision was placed. ***b)*** Placement of A-PRF membrane into the pouch and pushed coronally followed by suspensory suture placement.

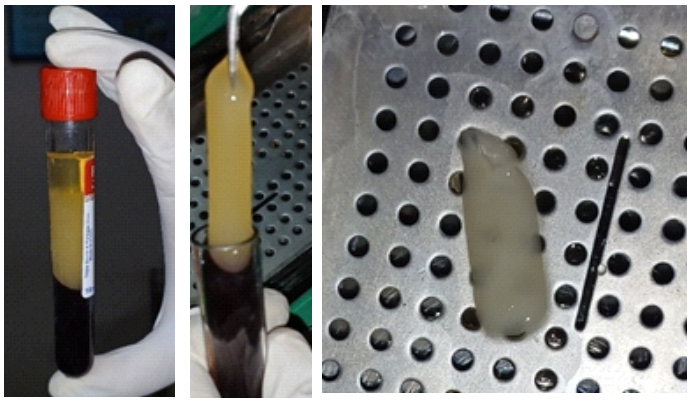

Fig.4 Preparation of A-PRF membrane (1500RPM for 14 Minutes)

The surgical site exhibited satisfactory healing. The Jemt Papilla Index [11] was used and papilla fill was assessed using Intra Oral Scanning (TRIOSTM Intraoral Scanner System) through ImageJ Software at baseline, 1 month, 3 months and 6 months postoperatively. Following are the values observed in both the cases:-

CASE 1 (SCTG)

	Baseline	1 month	3 months	6 months
JEMT Index	2	2	3	3
IOS (Volumetric Analysis mm3)	354	270	212	61

CASE 2- (A-PRF)

	Baseline	1 month	3 months	6 months
JEMT Index	2	2	2	3
IOS (Volumetric Analysis)	341	411	244	150

DISCUSSION

The challenge of reconstructing lost interdental papillae stems from the anatomical complexity and poor vascularization of the interdental region [4]. While SCTG has been the gold standard, with reliable results for soft tissue augmentation and root coverage, it carries the downside of requiring a second surgical site, increasing patient discomfort and operative time [5,12].

Both SCTG – treated site 22, 23 and A-PRF-treated site 21, 22 demonstrated a one-point gain in the Jemt Papilla Index. A-PRF offers a biologically active matrix enriched with leukocytes and platelets that gradually release key growth factors such as VEGF, PDGF, and TGF-β over a period of 10–14 days, which enhances tissue healing, fibroblast activity, and angiogenesis [7–9,13]. Furthermore, its pliability and fibrin matrix allow it to be molded precisely into the recipient site, acting as both a scaffold and biologic stimulant [14].

Studies by Fujioka-Kobayashi et al. and Ghanaati et al. emphasized the superiority of A-PRF over traditional PRF due to its modified low-speed centrifugation, which preserves more regenerative cells [7,13]. The Han and Takei's technique helps to preserve vascularity and provides a tension-free

environment essential for successful grafting [4]. Combining this technique with suspensory sutures, as advocated by Tinti and Cortellini, aids in maintaining the coronal position of the graft or biomaterial, ensuring greater stability and improved clinical outcomes [15,16,17].

Intra Oral Scanner was used to scan the surgical site to obtain standardized images and to eliminate the error while comparing the pre and postsurgical images. Michelinakis et al., who demonstrated that intraoral scanning is a reliable, non-invasive tool to assess soft tissue dimensional changes following periodontal interventions. The volumetric reduction of black triangle space reflects the natural remodelling and soft tissue shrinkage post-regenerative therapy.

The short-term results of this case echo findings from other clinical studies that show comparable or even superior performance of A-PRF in soft tissue augmentation compared to SCTG, with the added advantage of being minimally invasive [18–21]. Although the results are promising, it must be noted that a single case cannot be generalized. Larger, multicentre randomized clinical trials with long-term follow-up are essential to validate these findings and determine whether A-PRF can consistently replicate or surpass the outcomes of autogenous connective tissue grafts [22–24].

Additionally, patient-related factors such as satisfaction, pain scores, and preference for less invasive techniques should be evaluated in future studies. With increasing demand for aesthetic dental procedures, biologic alternatives like A-PRF could shift the paradigm in periodontal plastic surgery.

Though the results are promising, longitudinal studies with larger cohorts are required to establish statistical significance and long-term outcomes [23,24].

CONCLUSION

A-PRF demonstrates potential for esthetic improvement, faster healing, and patient comfort due to reduced invasiveness. A-PRF is equally effective in regenerating the lost papilla compared to SCTG. A-PRF can serve as a viable alternative to SCTG in papilla reconstruction.

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Unravelling Recurrence In Peripheral Ossifying Fibroma: A Case Report.

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ABSTRACT

The peripheral ossifying fibroma is one of a triad of lesions that present as a gingival mass. It develops due to irritation or trauma, being a reactive lesion of connective tissue. Among the lesions involving oral cavity, 1-2% are peripheral ossifying fibromas (POF), which make up 4–10% of gingival lesions. POF is a single, sessile or pedunculated, slowly developing nodular mass. It is typically found amidst the neighbouring teeth in the gingival papilla , Radiographic investigations show minimal to no bone involvement initially. Provisional diagnosis is based on clinical and radiographic findings. The main stay of treatment is surgical excision and elimination of local contributing factors, although has a high recurrence rate (8-20%), Hence this article presents a case report of Recurrent Peripheral ossifying fibroma.

Key Words :

Peripheral Ossifying Fibroma, Surgical excision, Recurrence, calcifying fibroblastic granuloma.

INTRODUCTION :

Gingiva is found to be frequently affected area of lesions in the oral cavity.[1] Gingival overgrowth like lesions were classified by Neville into varied groups as: Pyogenic granuloma, peripheral fibroma with calcification, calcifying fibroblastic granuloma, peripheral odontogenic ossifying fibroma, peripheral fibroma also known as fibrous hyperplasia and Peripheral ossifying fibroma.[2]

The peripheral ossifying fibroma is one of a triad of lesions that present as a gingival mass, usually emerging from interdental gingiva and seemingly from the periodontal ligament.[3] The other two lesions are the pyogenic granuloma, which may represent an early immature form of the peripheral ossifying fibroma, and the peripheral giant cell proliferation. The peripheral ossifying fibroma will be firmer and have a less friable nature than the other two lesions.[3]

A non-neoplastic growth called a peripheral ossifying fibroma (POF) develops on the gingiva subsequent to trauma or irritation by local factors. It is not the soft tissue equivalent of a central ossifying fibroma; rather, it is a reactive lesion of connective tissue.[4]

Peripheral ossifying fibroma (POF) is also known by other names in the literature as calcified or ossified fibrous epulis, peripheral fibroma with osteogenesis, peripheral fibroma with calcification, and calcifying fibroblastic granuloma.[5]

POF has a relatively high recurrence rate (8 to 20%). Its recurrence is probably caused by a number of causes, such as: (a) insufficient removal; (b) inadequate removal of local irritants; and (c) challenging access to the lesion during surgical manipulation because of the intricate interdental anatomy.[5]

Although soft tissue radiopacities may be seen, especially in bigger lesions, radiographic investigations often show minimal changes in the alveolar bone.[5]

Surgical excision is the main treatment for POF along with elimination of local irritants with oral prophylaxis.6 Due to high recurrence rate, a regular follow up is of prime importance.[6]

This article presents 40 year old Female presenting with recurrence of POF in the anterior maxillary gingiva

CASE REPORT :

Figure 1 (a)

40 year Female (Figure 1a) presents to the Department of oral and maxillofacial surgery, GDCRI Bangalore, with the chief complaint of recurrent swelling with upper left front teeth region for the past 1 year (Figure 1b).

The growth was 5*5mm initially, which gradually increased to the present size, painless and not associated with pus discharge or bleeding. Patient gave history of removal of similar swelling in the same region 5 years ago. Patient's medical and family history were not contributory. No deleterious hygiene habit found and oral hygiene status was poor. Extraoral examination revealed no abnormalities. Intra oral examination revealed a solitary immobile growth on the gingiva extending mesiodistally from mid crown portion of 23 to distal aspect of 25. The growth appeared mixed reddish and pink in colour. The growth was oval and approximately 4 × 3.5 cm in size with a hard fibrous consistency. It was non-fluctuant and non-compressible with mild bleeding on probing.

Figure 1 (b)

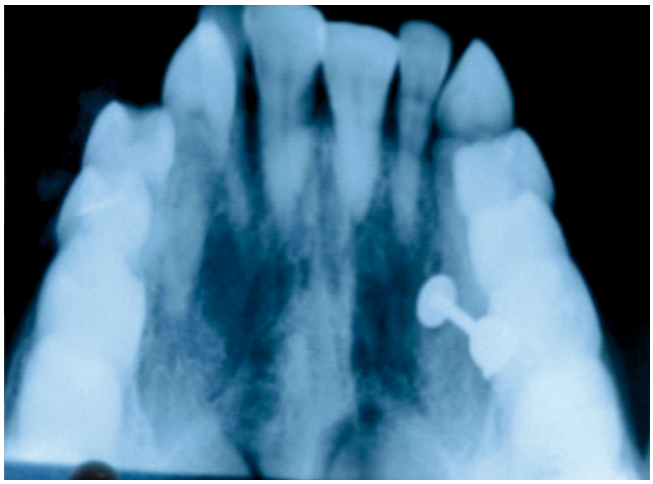

Figure 2

Maxillary occlusal radiograph reveals faint superficial erosion of the bone (Figure 2). All the routine blood investigations were done and determined to be within normal norms. To eliminate the local irritants, oral prophylaxis was performed. Following patient's informed consent , the tumor was excised conservatively. Hemostasis was achieved at the site and the surgical site was protected by surgical pack

Figure 3

Surgical site healing was satisfactory at follow up visit after 10 days. (Figure 3).

The tissue was sent to the department of oral pathology for histopathologic diagnosis. The microscopic examination of H&E stained section showed parakeratinized stratified squamous epithelium and underlying connective tissue. The epithelium exhibited

spongiosis, long and thin interconnecting rete ridges. The underlying connective tissue consisted of bundles of matured collagen fibres arranged in short and long fascicles interspersed with fibroblasts and fibrocytes along with trabeculae of bone, lacunae housing osteocytes, irregular masses of calcified tissue devoid of osteocytes were noted.

Endothelial lined capillaries engorged with RBC's, dense amount of mixed inflammatory infiltrate consisting of eosinophils, lymphocytes, plasma cells and mast cells were evident. Histopathological report suggested of Peripheral ossifying fibroma.

The definitive diagnosis of peripheral ossifying fibroma was made after considering the history, clinical presentation, radiological and histological examinations.

DISCUSSION:

Peripheral ossifying fibromas may be grouped into as either central or peripheral, and they primarily affect the craniofacial bones. The central type forms within the medullary cavity of the bone and expands from the endosteum or periodontal ligament (PDL) adjacent to the root apex.The peripheral type is found on the soft tissues that cover the alveolar process.[7]

POF is a single, sessile or pedunculated, slowly developing nodular mass. It is typically found in the space between neighbouring teeth in the gingival papilla. While the exact etiopathogenesis of periodontal ligament fibroids remains unknown, it has been proposed that these cells are the source. The fibrocellular reaction observed in the periodontal ligament, the existence of oxytalan fibers within the mineralized matrix of specific lesions, the proximity of the gingiva to the periodontal ligament, and the frequent manifestation of periodontal ossifying fibroma (POF) in the gingival interdental papilla are several factors that lend credence to the hypothesis that the ligament is derived from the gingiva. There have been reports of tooth migration in certain cases accompanied with interdental bone loss.[7]

The roentgenogram shows no discernible underlying bone involvement in the great majority of cases. Nevertheless, there are sporadic reports of superficial bone degradation.

The rare neoplasm known as peripheral odontogenic fibroma is thought to develop from odontogenic epithelial resting in the connected gingiva or periodontal ligament. Traumatic fibroma's are usually seen on buccal mucosa along the occlusal line.[7]

Clinically, peripheral giant cell granuloma and POF are identical; however, radiographically, POF exhibits calcification specks and lacks the purple or blue staining that is typically associated with peripheral giant cell granuloma.[7]

Of the lesions in the oral cavity, 1-2% are peripheral ossifying fibromas (POF), which make up 4–10% of gingival lesions. With a peak incidence in the second decade of life, this lesion primarily affects women in their second or third decade of life.[8]

Multifocal POF can also occur in oral as well as maxillofacial region and is frequently due to genetic abberations such as:

1. Nevoid basal cell carcinoma syndrome
2. Multiple endocrine neoplasia-type II
3. Neurofibromatosis
4. Gardner syndrome.[9]

There are differences in the radiographic characteristics of POF; certain lesions do not exhibit radiopaque foci of calcifications, however they have been observed to be dispersed throughout the lesion's center. The radiograph typically does not show underlying bone involvement. Seldom is there visible signs of superficial bone degradation.[10]

A confirmatory diagnosis of POF is made by histopathologic evaluation of biopsy specimens.[10]

Main stay of treatment is conservative local surgical excision and elimination of local irritants. Elevated risk of recurrence makes it mandatory for regular follow up.

CONCLUSION :

To establish the diagnosis of Peripheral Ossifying Fibroma, a histopathological examination is of prime importance because there are varied gingival lesions that present similarly. Clinical presentation of this case in female patient in her fourth decade of life, corelates with the frequent appearance of the lesion. Radiograph shows superficial erosion of bone. Surgical excision is considered treatment of choice. These lesions tend to have high recurrence rate compared to other reactive lesions as was seen with this case. POF resembles PGCG, pyogenic granuloma, and irritation fibroma; hence, comprehension of the surgeon is paramount in the diagnosis and managing such lesions.

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A Survey of Retention protocols and Trends among Orthodontists and Postgraduate Orthodontic Students in Bengaluru, India: A Questionnaire study

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ABSTRACT

Objective :

This study aims to assess current retention protocols and the types of retainers commonly used in orthodontic practice, including the perspectives of both qualified orthodontists and postgraduate students.

Methods :

A cross-sectional survey was conducted among 70 orthodontists and postgraduate students in Bengaluru using a validated online questionnaire comprising 27 questions, then divided into 8 sections. The survey explored retention protocols, including retainer types, duration, follow-up practices, and influencing factors. The questionnaire was distributed via Google Forms, and responses were collected anonymously from April to June 2025. Data was analyzed using descriptive statistics.

Results :

The survey of 70 participants (50% orthodontists, 50% postgraduate students) showed 100% prescribed retention appliances. Clear vacuum-formed (Essix) and fixed retainers were most commonly used. Retainer choice was mainly influenced by patient compliance and malocclusion type. Multistranded stainless steel was the preferred fixed retainer, typically bonded mandibular canine to canine. Most respondents advised retention for over one year, with many recommending lifelong fixed retention. All participants agreed on the need for national retention guidelines in India.

Conclusion :

Essix and fixed multistrand stainless steel retainers are the most commonly used appliances in orthodontic retention, favored for their effectiveness and ease of use. Fixed retainers are typically bonded from canine to canine in the mandibular arch, while Essix retainers are often used in the maxillary arch. The choice of retainer is primarily influenced by factors such as patient compliance, type of malocclusion, and treatment outcomes. Long-term retention, particularly with fixed appliances, is widely recommended to maintain treatment stability. These patterns highlight the need for uniform clinical guidelines to optimize retention strategies.

INTRODUCTION :

Relapse, defined as the tendency of teeth to return to their original positions following active orthodontic treatment, remains a significant challenge in orthodontics. Relapse not only affects the patient's time and financial investment but can also lead to aesthetic concerns, particularly due to undesirable changes in the anterior dentition. Such outcomes impact both the patient's satisfaction and the clinician's success. To prevent or minimize relapse, it is essential that every patient who completes orthodontic treatment receives

some form of retention appliance[1].

Retention aims to maximize post-treatment stability, which is often unpredictable across different types of malocclusion. The primary cause of relapse includes the elastic recoil of periodontal fibers, soft tissue pressures from the cheeks, lips, and tongue, ongoing craniofacial growth, and occlusal forces. Therefore, retention protocols focus on promoting tissue reorganization, minimizing growth-related changes, and allowing neuromuscular adaptation of teeth in their corrected positions[2].

Retention appliances, commonly known as retainers, can be either fixed or removable. Among these, bonded (fixed) retainers and vacuum-formed or spring retainers are widely utilized [3]. Numerous studies and surveys worldwide have evaluated retention strategies, retainer preferences, and patient satisfaction, yet there remains considerable variability in clinical practice. In India, data regarding retention protocols are limited, and national guidelines are lacking [4].

The purpose of this study was to identify the types of retainers most commonly used by practicing orthodontists and postgraduate students in Bengaluru, India, and to explore current retention protocols among this group. Understanding these trends is crucial to inform the development of standardized, evidence-based retention guidelines tailored to the local clinical context [5].

OBJECTIVES

To assess the retention protocols and retainer preferences among practicing orthodontists and postgraduate students in Bengaluru, Karnataka, India. It seeks to identify the commonly used types of retainers, evaluate the factors influencing retainer selection and duration, and emphasize the need for standardized retention guidelines within the regional orthodontic community.

MATERIALS AND METHODS

- A cross-sectional survey was conducted among practicing orthodontists and postgraduate orthodontic students in Bengaluru, India, to assess retention protocols and retainer preferences. The study was carried out over a period of three months, from April to June 2025.
- A structured and validated online questionnaire was developed using Google Forms, comprising 27 questions divided into eight sections. The questionnaire covered various aspects of retention, including demographic details, types of retainers used, factors influencing retainer selection, duration of retention, follow-up practices, patient instructions, and perspectives on the need for standardized national guidelines.
- The survey was distributed electronically via email and professional networks. Participation was voluntary, and informed consent was obtained at the beginning of the form. Responses were collected anonymously to ensure confidentiality. The data were organized and summarized to identify common trends and patterns in clinical retention practices.

Inclusion Criteria: Orthodontic postgraduates, orthodontic academicians, and orthodontic practitioners/clinicians who are members of the Indian Orthodontic Society were included in the study.

Exclusion Criteria: General dentists and other speciality dental professionals were excluded from the study.

The data collected through the survey were analyzed to identify trends and variations in responses based on factors such as clinical experience, level of training, and workplace setting. The results were used to understand the prevailing perceptions of orthodontists and postgraduate students in Bengaluru regarding the selection of retainers, duration of retention, and factors influencing retention protocols in routine clinical practice.

Statistical Analysis

- Descriptive statistics were executed with the aid of the Statistical Package for Social Sciences (SPSS) for Windows, version 26.0 (IBM Corp.).
- Throughout the analysis of survey results, we chose to analyze answers with most responses.
- In the descriptive analysis, the majority of responses were expressed as percentages (%) alongside the corresponding number of respondents (n).

RESULTS

A total of 70 respondents participated in the survey.

Questions	Responses (%)	Respondents' Answers
1. Are you?	Practicing Orthodontist – 50% Postgraduate Student – 50%	35 Practicing orthodontists, 35 PG students
2. Gender	Male – 47% Female – 53%	33 Males, 37 Females
3. If PG student, which year?	1st – 44% 2nd – 11% 3rd – 44%	15 (1st year), 4 (2nd year), 15 (3rd year)
4. Years in practice (orthodontists only)	0–5 yrs – 71% 6–10 yrs – 14% 11+ yrs – 14%	~25 (0–5 yrs), 5 (6–10 yrs), 5 (11+ yrs)
5. Practice setting (multiple options)	Private – 50% Hospital – 16.7% Dental College – 39%	Many respondents selected multiple settings.
6. Do you prescribe retention after every case?	Yes – 100%	All respondents prescribe retainers post-treatment.
7. Retainers used (multi-choice)	Essix – 94% Fixed – 78% Hawley's – 72% Begg – 44%	Most use a combination of Essix and fixed retainers.
8. Retainer choice based on malocclusion?	Yes – 100%	All adapt choice based on treatment case.
9. Factors influencing retainer choice	Compliance – 89% Malocclusion type – 89% Oral hygiene – 50%	Compliance and case type were top influencers.
10. Do you inform patients about retention during initial consult?	Yes – 94%	66 respondents educate at initial consultation.
11. Do you give written instructions about retainer wear?	Yes – 72% No – 28%	Majority provide written guidance.
12. Type of fixed retainer commonly used?	Canine to canine – 83% Premolar to premolar – 17%	Most prefer canine to canine bonding.
13. Type of wire for fixed retainers?	Twisted SS – 58% Multistrand SS – 42%	Twisted stainless steel is most preferred.
14. Adhesive used for fixed retainers?	Flowable composite – 72% Composite – 28%	Flowable is more widely used.
15. Do you fabricate your own Essix retainers?	Yes – 44% No – 56%	Over half outsource Essix fabrication.
16. Duration of retainer wear recommended?	1 year – 6% 2 years – 17% 3+ years – 28% Lifetime – 50%	Half recommend lifetime retention.
17. Do you adjust retainer protocols case-wise?	Yes – 100%	All adapt retention based on case complexity.
18. Do you monitor retainer compliance?	Yes – 78% No – 22%	Most follow-up on compliance.
19. Frequency of follow-up visits for retention?	Monthly – 28% Quarterly – 50%	Quarterly follow-ups are most common.

This survey's results indicate that retention is a universally adopted component of orthodontic practice among Indian professionals, with 100% of the 70 respondents prescribing retention appliances post-treatment. Clear vacuum-formed retainers (94.4%) were the most commonly used, followed by fixed retainers (77.8%) and Hawley's retainers (72.2%). Retainer selection was consistently case-specific, influenced primarily by malocclusion type, patient compliance, and oral hygiene status.

Multistranded stainless steel wire was exclusively preferred for fixed retention, most commonly bonded to the mandibular and maxillary anterior segments. Over 60% recommended a primary retention phase exceeding one year, and 41.2% advised lifelong fixed retention. Full-time use of removable retainers for 6–12 months was the most common protocol, followed by extended nighttime wear. Follow-up during the retention phase was mainly orthodontist-led, with most respondents scheduling two or more visits per year.

A majority (77.8%) adhered to a standardized retention protocol, and all respondents (100%) agreed on the necessity of national guidelines for orthodontic retention in India, highlighting the demand for consistent, evidence-based post-treatment care.

DISCUSSION

This survey provides valuable insights into the current retention practices among orthodontists and postgraduate students in Bengaluru, India. The results indicate a unanimous agreement (100%) among respondents on the necessity of prescribing retention appliances post-treatment, confirming that retention is a universally accepted phase in orthodontic care. This aligns with existing global literature, where retention is recognized as critical for maintaining post-treatment stability and minimizing relapse due to periodontal fiber recoil, occlusal forces, and residual growth changes [6,7].

Clear vacuum-formed retainers (Essix) were the most frequently used (94.4%), followed by fixed retainers (77.8%) and Hawley's retainers (72.2%). This preference pattern mirrors findings from the UK, Malaysia, and Ireland, where aesthetics, patient comfort, and ease of fabrication are prioritized [8]. The popularity of Essix retainers is likely attributed to their transparency and cost-effectiveness, especially when compared to Hawley's retainers, which are more durable but less aesthetic.

The use of fixed retainers, particularly multistrand stainless steel wires bonded from canine to canine, was widespread in both the mandibular and maxillary arches, consistent with international trends [9]. Canine-to-canine bonding was preferred by 83% of respondents, a protocol commonly adopted to prevent relapse in the anterior region—especially the mandibular incisors, which are more prone to post-treatment crowding. Similar practices have been observed in studies from Switzerland, the Netherlands, and the USA [7,8].

A significant portion (50%) of participants recommended lifelong fixed retention, while 28% advised retention for three or more years. These findings reflect the growing consensus in the orthodontic community that long-term, sometimes indefinite retention, is necessary to counteract late skeletal and dental changes [6,10]. Moreover, full-time use of removable retainers during the initial 6–12 months, followed by nighttime wear, aligns with protocols proposed by Parker [11], who emphasized the importance of prolonged fiber remodeling and neuromuscular adaptation for post-treatment stability.

Retainer selection was consistently case-specific, with patient compliance (89%), malocclusion type (89%), and oral hygiene (50%) being the primary influencing factors. These results are in agreement with prior studies that highlighted the need for individualized retention planning based on biomechanical, clinical, and behavioral considerations [12,13].

Interestingly, over 70% of respondents reported non-compliance, bond failure, and retainer loss as common complications, reiterating the importance of patient education and regular follow-up. Most orthodontists (78%) monitored compliance, and 72% gave written instructions—practices known to improve adherence and long-term outcomes. The preference for PET-G over PVC in Essix retainers further reflects a clinical trend toward using more durable, patient-friendly materials.

Follow-up visits during the retention phase were most often scheduled quarterly (50%), especially during the initial 3 months post-debonding—considered a critical period for relapse [8]. This approach emphasizes the proactive role of the orthodontist in ensuring retainer integrity and patient compliance.

Notably, all respondents (100%) expressed the need for standardized national retention guidelines, and 77.8% indicated they already follow a structured protocol. The absence of such guidelines in India has led to considerable variation in retention strategies, as shown in this study. This finding mirrors similar calls from practitioners in other countries, who have advocated

for uniform, evidence-based frameworks to reduce practitioner-dependent variability and improve long-term treatment outcomes[14].

Lastly, interdisciplinary communication appeared limited, with minimal reference to coordination with general dentists. This lack of collaboration has been identified in other regions as well [8,15]. Strengthening interprofessional cooperation could improve retainer maintenance and relapse prevention, particularly in general dental settings where patients typically return post-orthodontic treatment.

CONCLUSION

This study highlights that retention is an integral and universally accepted phase of orthodontic treatment among practitioners and postgraduate students in Bengaluru. Clear vacuum-formed (Essix) and fixed multistrand stainless steel retainers—especially those bonded from canine to canine—were identified as the most commonly used appliances. Retainer selection was primarily influenced by malocclusion type, patient compliance, and oral hygiene.

The majority of respondents favored long-term retention protocols, with many recommending lifelong use of fixed retainers to ensure treatment stability. Despite differences in clinical experience and practice settings, there was a strong consensus on the need for case-specific protocols and regular follow-up during the retention phase.

Importantly, all respondents agreed on the need for standardized national retention guidelines in India. These findings underscore the necessity for evidence-based, uniform clinical protocols to enhance consistency in retention practices and optimize long-term orthodontic outcomes.

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Digital Dentures in Clinical Practice: A Review of Fit Precision and Patient Acceptance

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ABSTRACT

The advent of digital technology has revolutionized the field of prosthodontics, offering a novel approach to fabricating complete dentures through computer-aided design and manufacturing (CAD/CAM). Digital dentures are gaining popularity due to their potential for improved fit precision, reduced clinical chairside time, and enhanced patient satisfaction. This review explores the workflow of digital denture fabrication, comparing intraoral scanning with conventional impressions, and evaluates the accuracy of different manufacturing methods such as milling and 3D printing. The clinical adaptation of digital dentures is assessed through various fit evaluation methods, including visual inspection, disclosing paste, 3D superimposition, and pressure-mapping technologies. Patient acceptance is discussed in relation to comfort, aesthetics, functional outcomes, and reduced adjustment visits, supported by tools such as the Visual Analogue Scale (VAS) and OHIP-EDENT. Advantages such as reproducibility, faster turnaround, and ease of remakes are highlighted alongside limitations like high initial costs, scanning challenges, and material durability. Emerging trends such as AI integration, smart materials, and teledentistry hold promise for further enhancing digital workflows. Overall, the evidence suggests that digital dentures offer significant clinical and patient-centred benefits and are likely to become the future standard of care in edentulous prosthetic rehabilitation.

Keywords : Digital dentures, CAD/CAM, patient satisfaction, denture fit, intraoral scanning, milling, 3D printing, prosthodontics, OHIP-EDENT, artificial intelligence, dental materials

INTRODUCTION

Digital dentures signify an important breakthrough in prosthodontics, using contemporary digital technologies into the production of removable complete dentures. They are characterised as dentures produced with computer-aided design and computer-aided manufacturing (CAD/CAM) processes, utilising either subtractive (milling) or additive (3D printing) manufacturing methods. Digital dentures can be categorised according to the workflow into complete digital workflow (entirely digital from impression to finished denture) and hybrid workflow (a combination of digital and conventional processes). [1]

The conventional approach to denture fabrication necessitates several clinical appointments for impressions, bite registration, trial insertion, and final fitting. The digital workflow can markedly enhance these processes, minimise human error, and expedite turnaround time. The utilisation of intraoral scanners, digital articulators, and virtual teeth arrangement software enhances the predictability and standardisation of the process. This transition is especially pertinent when patient expectations increase and practitioners pursue efficient, consistent results.[2]

Fit precision and patient acceptance are two essential criteria for assessing the efficacy of full dentures. Precise adaptation to the edentulous ridge

improves retention, stability, and comfort, thus affecting masticatory efficiency and speech. The visual and functional results of digital dentures greatly affect patient satisfaction and adherence. Research indicates that digital dentures, owing to accurate milling and uniform polymerisation of denture base materials, may provide enhanced adaptation to soft tissues relative to conventionally fabricated dentures.[3]

The main aim of this review is to evaluate the clinical precision and fit of digital dentures and to investigate how these elements influence patient happiness and acceptance. The objective is to identify existing limits, emphasise recent breakthroughs, and offer insights into future trajectories for the use of digital denture systems in standard clinical practice.

WORKFLOW OF DIGITAL DENTURE FABRICATION

INTRAORAL SCANNING VS CONVENTIONAL IMPRESSIONS

Intraoral scanning (IOS) is fundamental to digital dentistry, enabling the acquisition of 3D surface data of edentulous arches. In contrast to conventional impressions utilising materials like alginate or elastomers, intraoral scanning (IOS) provides benefits such as immediate visualisation, iamproved patient comfort, eradication of impression material deformities, and digital storage capabilities. Nonetheless, accurately recording completely edentulous ridges remains a technological challenge due to the absence of solid landmarks and the presence of mobile soft tissues.[4] To address this, certain systems utilise reference markers or scanning algorithms to improve stitch precision and reduce distortion. Conversely, traditional perceptions, although reliant on the operator, are consistently dependable and well-established. They necessitate numerous appointments and are prone to material contraction, tray misalignment, and patient discomfort. Notwithstanding these challenges, traditional impressions remain frequently employed as the preliminary phase in numerous "hybrid" digital workflows, particularly in instances where scanners are inaccessible or where scanning edentulous arches proves too challenging.[5]

CAD (COMPUTER-AIDED DESIGN) TECHNIQUES

CAD technology is employed to digitally design the denture utilising the digital impression data. It encompasses the definition of the occlusal plane, the selection and arrangement of prosthetic teeth, and the simulation of aesthetics and functionality. Software platforms such as 3Shape Dental System, exocad, and AvaDent offer customisable libraries and automated dental configurations. This phase improves accuracy, minimises operator bias, and facilitates real- time adjustments prior to production. The primary advantages of CAD in dentures encompass the capability to visualise virtual wax-ups, effortless duplication, and a reduced requirement for post-processing modifications. Moreover, algorithms can replicate occlusion dynamics and articulation, hence enhancing functional balance.[6, 7] Nonetheless, proficiency with CAD software necessitates training and entails a learning curve for conventional prosthodontists adapting to digital practice.

CAM (COMPUTER-AIDED MANUFACTURING): MILLING VS 3D PRINTING

The CAM procedure entails transforming the CAD design into a tangible denture base by either subtractive (milling) or additive (3D printing) methods. Milling, often performed using pre-polymerized PMMA discs, produces exceptionally dense and precise denture bases characterised by reduced voids, enhanced mechanical strength, and reliable tissue adaption. This technique is optimal for high-precision, long-lasting dentures. Nonetheless, it results in material waste and tool degradation over time.[8] Three-dimensional printing, particularly utilising methods such as stereolithography (SLA) or digital light processing (DLP), facilitates the creation of intricate geometries, optimises material use, and accelerates production rates. It is progressively utilised for provisional dentures or temporary prosthetics. Nonetheless, printed denture resins may exhibit diminished strength and necessitate post-curing, with their long-term durability remaining subject to assessment.[9]

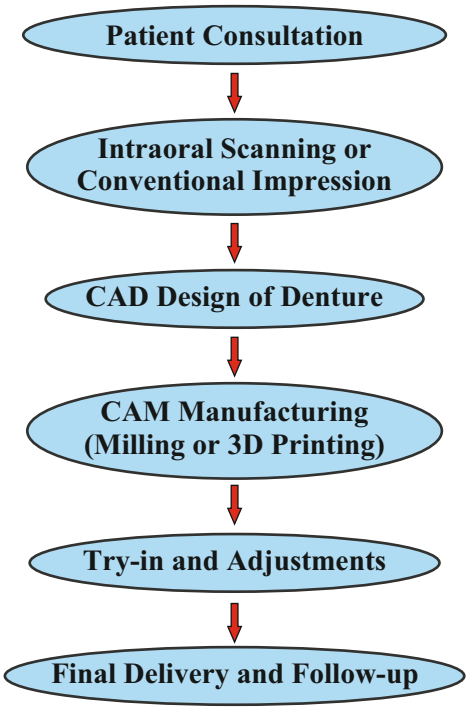
MATERIALS USED IN DIGITAL DENTURES (PMMA, HYBRID COMPOSITES)

Polymethyl methacrylate (PMMA) is the benchmark for denture bases in digital workflows, owing to its biocompatibility, aesthetic qualities, and established handling features. In CAD/CAM systems, industrially pre-polymerized PMMA discs are utilised, yielding enhanced homogeneity, diminished porosity, and superior mechanical qualities relative to conventionally processed PMMA.[10]

Hybrid composites and innovative resin materials have also arisen, particularly in 3D printing. These materials are engineered to provide superior flexibility, improved polishability, or higher impact resistance. Nonetheless, numerous materials are currently in the process of long-term clinical validation and do not possess the comprehensive performance history of PMMA. Concerns persist regarding brittleness, colour stability, and ageing behaviour under oral conditions.[11]

This below flowchart illustrates the step-by-step process involved in the digital fabrication of complete dentures, starting from patient consultation and scanning to the final delivery and follow-up. (Figure 1)

Figure 1: Workflow of Digital Denture Fabrication

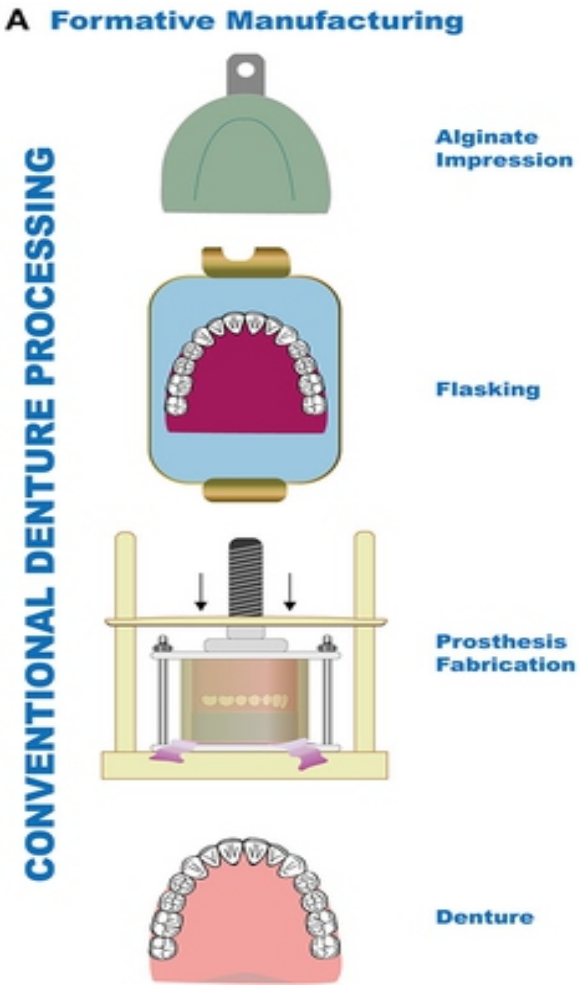


COMPARISON WITH CONVENTIONAL TECHNIQUES

Digital and conventional denture workflows differ in various ways:

- Digital methods speed up delivery by reducing clinical visits and laboratory processes.
- CAD/CAM-milled dentures are more accurate and respond to tissue, reducing uncomfortable spots&modifications.
- Replicability: Digital documents can be kept and reused for easy duplication.
- Cost and accessibility: Digital methods require software, gear, and technician skill, and may be initially more expensive.

Traditional dentures are still better for unique anatomical circumstances, especially when digital scanning or printing fails. The learning curve, upfront expenditure, and technical constraints can hinder smaller operations.[12,2]



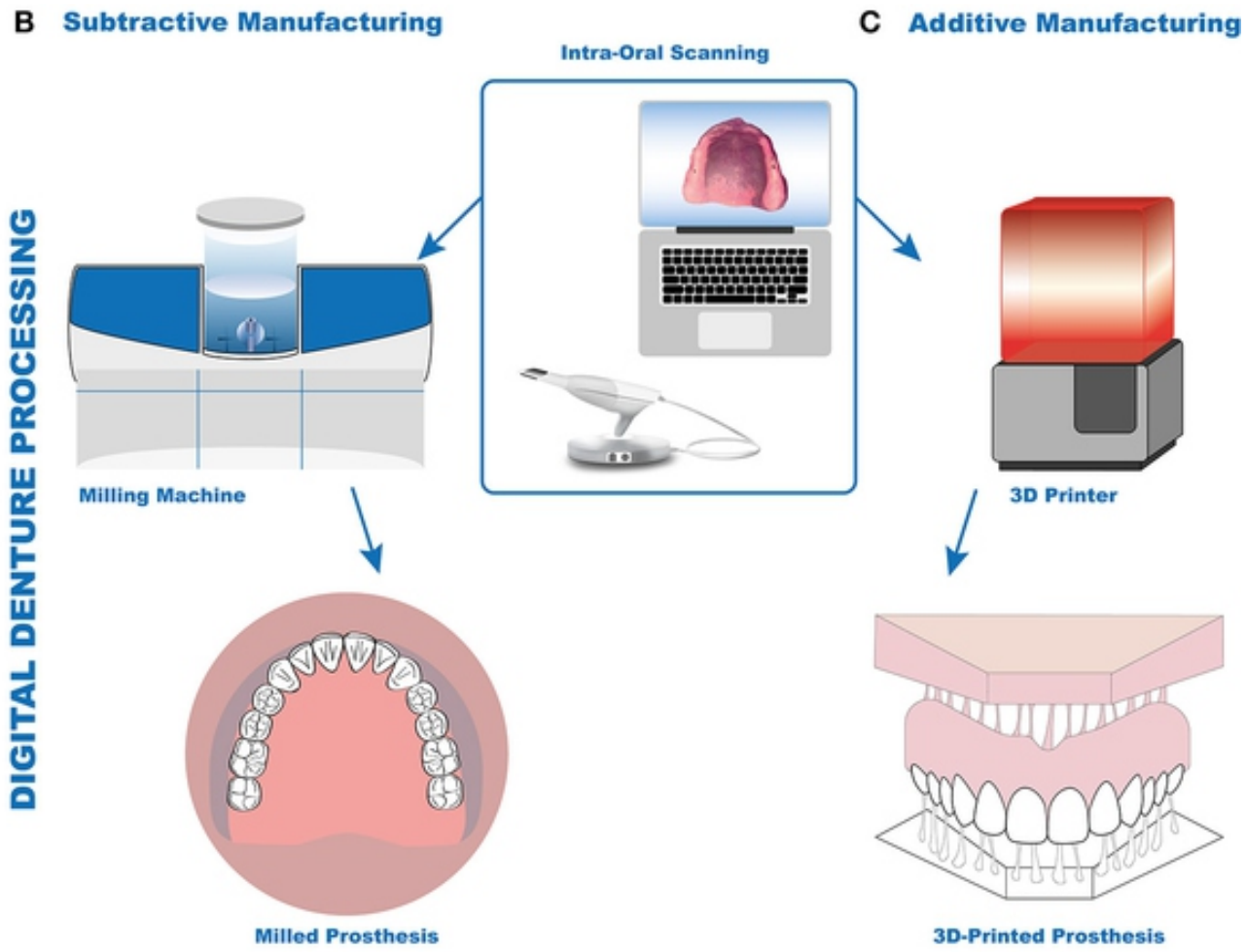


Figure1: Traditional and digital denture fabrication methods: A – formative manufacturing, B – subtractive manufacturing, C – additive manufacturing.

CLINICAL FIT PRECISION

The clinical success of complete dentures relies heavily on their precise fit. "Fit" broadly refers to how closely the intaglio surface of a denture adapts to the underlying mucosa.

It can be broken down into three interrelated parameters:

- Retention: The resistance to vertical dislodging forces, critical for denture suction and function.
- Stability: The resistance to horizontal or rotational forces during mastication and speech.
- Adaptation: The closeness of contact between the denture base and the mucosal surface, determining how well the denture seats on the ridge.[13]

High-quality adaptation ensures fewer sore spots, better load distribution, and greater comfort for the patient.

EVALUATION METHODS

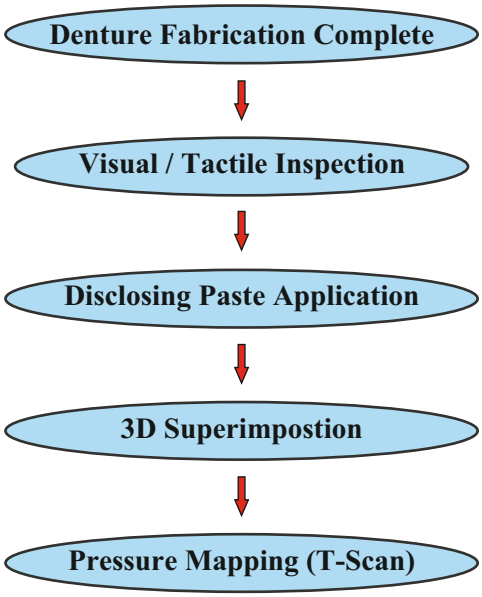
Visual/Tactile Inspection - This is the most basic method, wherein clinicians assess denture seating and contact points using finger pressure and observation. While subjective and limited by clinician experience, it remains a useful chairside technique to detect gross misfits.

Disclosing Paste - A pressure-indicating paste or silicone-based medium is applied to the intaglio surface. Areas of excessive pressure result in paste displacement or thinning, guiding selective relief. Though widely used, it lacks quantitative accuracy and is technique-sensitive.[14]

3D Superimposition Studies - These involve scanning the denture intaglio surface and the master cast or intraoral scan, followed by digital overlay and color-coded deviation mapping. Such studies offer micrometer-level quantitative fit analysis and are valuable in research comparing fabrication techniques.[15]

Pressure-Mapping Technologies - Advanced pressure sensors or electronic film systems, such as T-Scan, assess occlusal forces and pressure distribution between denture base and mucosa. These methods are precise but are costly and less feasible in routine practice.[16]

Below is a visual representation of common clinical and digital methods used to evaluate denture fit. (Figure 2).



FACTORS INFLUENCING FIT

Scanner Accuracy - Digital impression accuracy is influenced by the scanner's resolution, scanning strategy, ambient lighting, and surface reflectivity. Scanning edentulous arches is inherently difficult due to a lack of anatomic landmarks, making scanner precision crucial to achieve accurate digital models.[12]

Impression Technique - Errors during conventional impressions—such as over extension, compression of tissues, or improper tray selection—can lead to poor adaptation. In contrast, digital impressions may bypass some of these issues but require meticulous soft tissue management during scanning.[17]

Material Shrinkage/Expansion - Conventional denture processing using heat-polymerized acrylic is subject to polymerization shrinkage and thermal contraction, which can distort fit. Conversely, pre-polymerized PMMA blanks used in CAD/CAM milling are dimensionally stable, enhancing base adaptation. 3D printed resins may still shrink slightly during post-curing, which may impact fit quality.[18]

PATIENT ACCEPTANCE AND SATISFACTION

The clinical effectiveness of complete dentures, especially in the age of digital fabrication, depends on how patients perceive, adapt to, and accept them. Comfort, functionality, aesthetics, speech enhancement, and psychosocial adaptation affect patient satisfaction. These outcomes are crucial for clinical performance evaluation and denture design and delivery innovation. Several patient satisfaction indicators are frequently utilised.[19] The VAS is a simple tool where patients mark their happiness or discomfort on a 10-centimetre line anchored by extremes like “very unsatisfied” and “very satisfied.” Pain, retention, aesthetics, and comfort are often assessed using it. Though easy to use, it may not capture nuanced comments across domains.

The more comprehensive Oral Health Impact Profile for Edentulous Patients (OHIP-EDENT) assesses the effects of edentulism and prosthesis use on functional limitation, physical pain, psychological discomfort, physical disability, and social disability. This verified questionnaire explores how the denture impacts the patient's everyday life and mental health. OHIP-EDENT studies show that milled digital dentures have superior retention and fit, resulting in lower impact scores and greater quality of life. PROMs provide patient-specific insights about therapy benefits.[20] Choices include chewing ease, speech development, aesthetics, and social confidence. PROMs are useful because they reflect subjective feelings that may not match clinical measurements.

A well-fitting denture may not satisfy a patient if aesthetics or phonetics are lacking. Digital dentures' adoption depends on many factors. Most patients prioritise comfort and retention. Digital dentures, especially CAD/CAM-milled ones, adapt better to tissue, reducing painful spots and improving suction. This makes the experience steadier and more painless, increasing acceptability.[21] Cosmetics are also important—digital procedures allow patients to virtually approve tooth placement and colour matching, boosting smile pleasure.

Delivery time also boosts acceptance. Traditional dentures take 4–6 appointments, whereas digital dentures can be provided in two, saving time and patient fatigue. Due to their better initial fit, digitally manufactured dentures require fewer adjustments. For older or medically compromised people who struggle with dental visits, such an arrangement is convenient.

Literature suggests digital denture users are happier. Bidra et al. found that patients preferred digital dentures for comfort and function.[2] Another study by Yoon et al. found that milled dentures required fewer post-insertion modifications and increased satisfaction.[15]

Psychological and functional effects are closely linked to denture acceptance. Improved retention and aesthetics boost self-esteem, socialisation, and denture shame management. Speech and mastication improvements boost eating and communication confidence, which improves quality of life.

CLINICAL ADVANTAGES OF DIGITAL DENTURES

One of the greatest clinical benefits of digital dentures is reduced chairside time. Traditional denture manufacture requires 4–6 patient visits for impressions, jaw relation records, trial denture implantation, and delivery. Intraoral scanners and premade digital designs reduce many of these stages to two appointments in digital workflows.[22] This streamlining helps physicians and patients, especially the elderly or medically compromised who may have trouble with many visits.

Repeatability and digital records are improved with digital dentures. You can use the digitised patient data for changes, remakes, and revisions at any time. This digital record reduces the need for extensive diagnostic or clinical procedures in the event of prosthesis fracture, loss, or wear, improving patient convenience and continuity of care. Another benefit is faster fabrication and turnaround. CAD/CAM milling and 3D printing speed up manufacturing by eliminating wax-ups and flasking. Digital labs can supply dentures in days instead of weeks, which is useful in hospitals and time-sensitive circumstances.

Digital dentures are easy to remake and duplicate.[23] Digital design preservation allows for the precise reproduction of missing or destroyed dentures. Reproducibility saves laboratory and clinical workload and assures patients receive an exact reproduction of a well-fitting prosthesis. Finally, some clinical settings may save money over time. Digital systems are expensive, but they reduce appointment times, material usage, remake frequency, and storage needs, which may save money over time, especially in high-volume offices.

LIMITATIONS AND CHALLENGES

Despite their benefits, digital dentures have drawbacks. Digital equipment and training costs are major obstacles. CAD/CAM, 3D printers, intraoral scanners, and software are expensive. To use these systems, doctors and laboratory workers must undergo substantial training, which may inhibit smaller practices or resource-limited settings. Clinicians switching from standard procedures face a steep learning curve. Time and adaptability are needed to master digital design software, analyse digital impressions, and integrate with laboratory procedures. Poor training might lead to design or execution errors that lower prosthesis quality.

The scanning of edentulous arches is technically limited.[24] No permanent markers exist for edentulous arches, and soft tissue compressibility makes scanning difficult. In particular, stitching mistakes, inadequate data acquisition, and poor surface detail occur in the posterior regions. New

tissue stabilisation and scanning assistance methods are being developed.

Some 3D printed materials have lower fracture resistance and wear than traditionally cured PMMA. Milled PMMA is stronger and homogeneous, but printed materials—especially temporary dentures—may become brittle, degrade, or discolour with time.[25] Some digital dentures need relining, especially if patients have considerable residual ridge resorption or tissue remodelling after extraction. Since the intaglio surface is milled or printed from static scans, soft tissue changes over time may cause poor fit and require rebasing or relining.

FUTURE DIRECTIONS AND INNOVATIONS

As technology advances, digital dentures will change quickly. Integration of AI and machine learning is important. AI algorithms can model occlusal stresses, anticipate optimal tooth location, and offer design changes based on patient data.[26] This improves denture precision and personalisation and reduces manual inputs. 3D printing will transform denture fabrication. Multi-material printers, faster curing technologies, and improved resin compositions will enhance the durability, aesthetic appeal, and flexibility of dentures. These technologies may outperform milling in cost and design freedom. Biocompatible and smart materials are also coming. Digital dentures could be made safer and more useful with antimicrobial PMMA resins, thermochromic polymers, and bioresorbable scaffolds for tissue integration.

Clinicians can offer prostheses that match anatomical traits, facial aesthetics, and patient preferences using personalised digital processes that integrate data from cone-beam CTs (CBCTs), facial scanners, and digital smile design tools. Personalisation can improve adaptability and pleasure. Teledentistry technology can also enable virtual tryouts, consultations, and data transfers to central fabrication centres. This helps in rural or underserved locations where prosthodontic care is scarce. High-quality, customised dentures can be made without in-person visits.

CONCLUSION

Digital dentures combine clinical creativity with precision to revolutionise denture fabrication. Due to improved adaptability and fewer polymerisation distortions, digital workflows improve fit precision for CAD/CAM-milled dentures. Digitalisation improves patient acceptance by increasing comfort, aesthetics, and convenience satisfaction. These healthcare solutions save chairside time, offer consistent results, and streamline patient and practitioner experiences. While cost, technical problems, and occasional relining remain, AI, materials, and digital workflow advancements are increasingly overcoming these obstacles. Finally, digital dentures improve prosthodontic care and are no longer futuristic. They can become the standard of care in edentulous therapy with proper training and technology, improving patient results and practice efficiency.

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Stress: A Silent Assassin Of The Dental Professional

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INTRODUCTION

Dentists are one of the most respected health care professionals across the globe. The job satisfaction, the financial benefit and glamour of dentistry are unmatched. Behind the face of the glimmer lies a gamut of occupational hazards that are of immense impact. The common hazards faced by dentists are; exposure to infectious disorders, respiratory issues due to aerosols, musculoskeletal problems of back neck and shoulders, carpel tunnel syndrome, dermatoses, eye injuries, noise related problems, vibration induced neuropathies, radiation hazards and psychological concerns. [1,2,3]

Among these umpteen hazards, lies the silent malady of psychological wellness, among which stress emerges to be top spoiler. In fact, the presence of plentiful occupational hazards is a contributor to the problem of stress among dentists.[4, 5, 6] The present article tries to address the different aspect of the burden of stress among dental professionals, its role as an assassin of their wellbeing and plausible solutions to the same.

BURDEN OF STRESS

Stress is a modern day epidemic affecting almost everyone, almost like an evolutionary glitch. The fast paced change in our lifestyle is leaving human physiology to lag behind. The modern day hassles like overcrowding, rat race, deadlines, unfulfilled expectations and lack of control are perceived as danger to survival by the body. As a result the body responds appropriately by getting ready for 'fight or flight'. This response is however largely unwarranted, infact harmful to the individual.

Studies conducted across the world point to an increased prevalence of mental health issues like stress, depression, anxiety and post traumatic stress disorder among dentists. [7,8] In a study conducted by the American Dental Association, more than 70% of the dental practitioners experience high to moderate amounts of stress.[4]

The impact of stress on an individual is manifold; physiological, psychological and behavioural. The effects of stress eventually spill over to the professional as well as personal life.[4] Chronic non communicable diseases which are front runners in the reason for mortality in the twenty-first century have their roots embedded in stress. Since dentists are one of the highly stressed group of professionals, the burden of these modern day ailments are high among dentists. Cardiovascular diseases, cancers and suicide are leading causes of mortality among dentists and not surprisingly all are stress related.[1] Metabolic diseases like diabetes, obesity, autoimmune diseases, bruxism, chronic fatigue are also seen more among dentists than the general population.[4]

Stress related psychosomatic problems like headache, insomnia and neurotic behaviour are also quite common among dentists.[9] Leading causes of impairment among dentists are also stress related namely mental illnesses, alcohol and smoking dependence.[1] These impairments limit the coping ability further and also pose challenges to productivity and efficiency of dentists.

Long standing stress eventually may lead to professional burnout, psychological morbidity and suicidal intent.[8] Alarming is the accentuated effect of stress among women dentists compared to

men.[1,9] General practitioners, pedodontists and periodontists report higher stress compared to other specialists.[10]

SOURCES OF STRESS

Sources of stress have been classified into macro, middle and micro level stressors.[11] Unreasonable regulatory factors which are biased against caregivers making then susceptible to litigations are key stressors. Target driven corporate culture in private hospitals is another predatory stressor at the macro-level. Financial pressures are another major stressor for dentists especially at entry level.

In the middle level, stressors listed were ruthless competition for survival, lack of suitable materials and unfriendly work atmosphere. Time constraints are extremely harsh for dentists when they spill over to the operatory and beyond. Unmatched expectations from patients drive dentists to be over cautious in their practice. Understaffing, rapid turnover of auxillaries and constant retraining of support staff take a toll on the work quality.

Sedentary life style, neglected personal health, disregard for mental wellbeing and inability to maintain personal relationships with family and friends make up the micro level stressors. Practice management, challenges in staff supervision, patient load, compliance issues, unreasonable expectations, debt load, social problems like isolation and loneliness are other common issues. Stigmatization of mental health issues further aggravates the problem.[7]

Lack of work life balance is often reported by dentists as a cause of concern, especially among women dentists and younger practitioners.[10] Uncertainty about future as a dental professional and career growth options keep lingering in the background with rapid advancements in technology. All these stressors result in dentists cutting corners and practice of defensive dentistry.

COPING WITH STRESS

Preventive measures are the need of the hour to minimize the vagaries of stress. Primary preventive measures include elimination of the sources of stress especially the regulatory and work environment related. Just and reasonable regulations need to put in place to prevent undue exploitation of caregivers. Corporate hospitals need to prioritize quality over targets which benefits in reducing stress burden on dentists and improving treatment outcomes for patients. Early detection and treatment of stress related problems constitute the secondary prevention. Increasing awareness among dentists on the importance of mental health, training and incorporation of psycho-education in the curriculum are steps which help in this direction. Tertiary prevention is made up of recovery and rehabilitation of those affected. Counselling services come under this juncture.[12]

Increasing awareness of mental health, improved working conditions, expansion of mental health services, accessibility to mental health services, inclusion of mental health in dental curriculum and organization of support groups are some excellent strategies to facilitate coping with stress.[7] Engaging in sports, regular exercise regimen, practice of yoga and application of relaxation techniques help dentists manage stress. Development of financial and business management skills early on in the practice would be handy. Training in principles of psychology and communication will enable dentists to confront the challenges thrown by a busy dental practice.[10]

Early identification of stress and its effects help in instituting remedial steps. Better coping will lead to better productivity in terms of quality and quantity among dentists resulting in increased quality of life.[13,14] As profession, we have to take up the matter of stress as being serious and tackle the same with utmost urgency as the problem has come knocking on the doorstep.[11]

ADDRESSING THE ELEPHANT IN THE ROOM

The problem of stress is not adequately addressed by the profession itself due to a number of reasons like lack of research on the topic, normalization of high stress among dentists, habit of putting on a bright face as part of the professional culture, probably the stigma associated with seeking mental health services.[4,15]

The onus of addressing the gaps in research related to the issue of stress and methods to tackle the same

rests with dentists themselves. The professional bodies, regulatory authorities and dental teaching institutions should encourage research to this neglected area. The problem needs to be addressed right at the training of new dental professionals.

Posture practice should be the key skill instilled into the training modules for undergraduate dental students. Addition of mind body practices like Yoga and meditation to the curriculum is the need of the hour to empower the future professionals to brace for the highly demanding profession.[16] These practices not only strengthens the mind body connection, improves focus, concentration and self awareness but also builds resilience needed to cope with unavoidable stress.[17]

Professional bodies like the Indian Dental Association should take it upon themselves to provide the robust support facilities and improve the network strength of the dentists, so that dentists are not left feeling vulnerable. Impressing upon the regulatory bodies to make necessary changes to the dental curriculum is advocated. Suitable changes to the malpractice and medical negligence laws, so that genuine providers of oral health are not victimized. The dentists themselves should recognize the demands of the profession and empower themselves, bring suitable changes to their lifestyle and prioritize their mental well being.

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Yellow Hues, Oral Clues: A guide to lesions in view

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ABSTRACT

Among the plethora of lesions that occur in the oral cavity, yellow lesions are less prevalent in comparison to the red and white lesions and they constitute a heterogeneous group of conditions demanding careful diagnostic considerations. Their distinct colour gives valuable insight of the underlying pathogenesis. They range from benign anatomical variations to serious pathological entities or systemic conditions. The characteristic yellow colour can be attributed to external and internal factors. Identification and differentiation of yellow lesions is important for providing specific treatment which in turn has a significant impact on the disease prognosis. This review aims to enhance clinicians' ability to identify, differentiate and manage yellow lesions within oral cavity effectively.

Keywords : Yellow lesions, differential diagnosis, mucosa, oral manifestations

INTRODUCTION:

The lesser prevalent yellow lesions of the oral cavity constitute many diverse conditions. Physiologic tissues that appear yellow are adipose tissue, lymphoid tissue and sebaceous glands (Fig: 1). It is considered pathological when these tissues undergo hypertrophy / hyperplasia, cystic, reactive change and neoplastic proliferation as seen in Fordyce's granules, Lymphoepithelial cyst, Dermoid and Epidermoid cyst, Verruciform xanthoma and Lipoma. Besides, sialolith/ tonsillolith composed mainly of calcium and systemic conditions such as jaundice with deposition of bilirubin in tissues appears yellow. These sheer variety of diseases necessitates the requirement of a working classification.[1] **(Fig:2)**.

Yellow Granules as a Diagnostic Clue : Certain oral lesions appear yellow due to the presence of yellow granules.

1. **Actinomycosis:** It is a bacterial infection caused by Actinomycosis israeli, presents as an indurated area with multiple small, communicating abscesses in the cervicofacial region. Lesions tend to form sinus tracts that communicate with the skin and drain a purulent discharge containing "sulfur" granules (rounded or spherical, usually yellowish, and ≤1 mm in diameter). These sulfur granules, which do not actually contain sulfur, are named for their yellow appearance and consist of a tangled mass of branching filaments of Actinomyces and are pathognomonic for actinomycosis.[2]

2. **Abscess:** An abscess is a localized collection of pus within a tissue, primarily caused by bacterial infection. It appears yellow or whitish-yellow and contains enzymes and cellular components that give it a characteristic yellowish hue. Commonest example is Dentoalveolar abscess. Finding yellow substance during aspiration, incision or drainage give a clue to the presence of an abscess.[3]

3. **Cholesterol Deposits:** Are seen in periapical granuloma/ cyst and also in inflamed odontogenic cysts. Although cholesterol itself is naturally white or colourless, the deposits

take on a yellow hue due to the presence of carotenoids and other lipids within them.[3]

Characteristics of other yellow lesions:

Fordyce Granule: Fordyce granules are ectopic sebaceous glands in the oral cavity. These are asymptomatic papules of 1-3mm diameter and do not increase in size. They present as white-yellow-colored papules on the vermillion border of lips, buccal mucosa, retromolar pad and tonsillar area. They usually appear as isolated or scattered patterns, which may cluster in groups of around 50-100 spots. The exact cause of Fordyce granules still remains unknown, but some studies have linked Fordyce spots to hormonal changes or overgrowth of ectopic sebaceous glands and high lipid profile. Biopsy is not essential for diagnosis and treatment is not required as these are very common and occur in up to 70-80% of adults and are considered as normal anatomic variations. However certain individuals may opt for treatment due to cosmetic concerns.[4]

Lympho epithelial Cyst: It is a unilocular cyst that develops within the salivary gland, neck and intra orally. They present as asymptomatic, well circumscribed sessile or pedunculated yellow papules or nodules in the oral cavity. It originates from cystic transformation of glandular epithelium entrapped within the oral lymphoid aggregates during embryogenesis. They are mainly found in the floor of the mouth or tongue commonly. It is seen in association with autoimmune disease like Sjogren syndrome and in rare cases with HIV. Microscopically, OLCs are covered by stratified squamous epithelium with a dense lymphocytic infiltrate in the fibrous capsule, often containing lymphoid follicles.[5]

Epidermoid & Dermoid Cyst : These are rare, developmental, non-odontogenic cysts of the oral cavity. They are most commonly found in the floor of the mouth, more frequently the midline. They are yellowish, slow growing, painless masses that lead to restricted tongue movements and larger cysts may cause dysphagia & dyspnoea. Yellow hue is due to the presence of keratin in the cyst lumen. Pathologically, both the cysts are lined by keratinized stratified squamous epithelium. The dermoid cyst is characterised by the presence of one or more dermal appendages in the cyst wall such as sebaceous gland, sweat glands, hair follicle whereas epidermoid cyst is devoid of these appendages.[6]

Verruciform Xanthoma: It is a rare, benign mucocutaneous lesion characterized by papillary projections of the epithelium and a collection of foamy macrophages (xanthoma cells) in the underlying connective tissue. It clinically appears as a well-demarcated, solitary, sessile or pedunculated lesion with a rough pebbled surface, yellowish-white or red in appearance depending on the degree of keratinization and the number of lipid-laden macrophages in the connective tissue papilla.[7] The most common locations in descending order are the gingiva, palate, buccal mucosa, tongue, vestibule, lip & floor of mouth.[8]

Sialolith and Tonsillolith : Sialolith is a calcified mass (stone) that form in salivary glands, while tonsillolith is hardened deposits (often white or yellow) that form in the crypts of the tonsils. The yellow colour of both sialoliths and tonsillolith is a result of the presence of various components, including organic debris, bacteria, and minerals, which contribute to the overall composition and colour of the stones. Sialography is traditionally regarded as the gold standard for diagnosing sialolithiasis as it allows excellent visualization of the salivary ducts and underlying ductal pathology.[9]

Lipoma: Lipomas in the oral cavity are uncommon benign tumors composed of mature adipose tissue. They are typically asymptomatic, slow-growing, and appear as a soft, yellowish, nodular mass. The occurrence of lipoma is rare in the oral cavity (1–4%)[10]; however, the frequency is much higher in the head and neck region. Common site of occurrence is in the buccal mucosa followed by lips, tongue, palate, buccal sulcus, and floor of the mouth.

The "slip sign" is a physical finding used to help diagnose lipomas, particularly those in the oral cavity.[11] It refers to the sensation of the lesion slipping or moving beneath the fingers during palpation. After excision, lipomas float in formalin.

Liposarcoma: Oral liposarcoma is an extremely rare malignant neoplasm of fat cells, that is often clinically misdiagnosed as a benign lesion because of its asymptomatic and indolent clinical course. Oral lesions are yellow in colour and involve buccal mucosa and tongue of middle-aged adults with a male predominance. Clinically, they appear as well circumscribed, yellow masses. Microscopically, fat cells show atypical nuclei, and pleomorphism and biopsy is the gold standard for the diagnosis.[12]

Jaundice: Jaundice (hyperbilirubinemia) is a condition where the skin, the whites of the eyes, and oral mucous membranes turn yellow. It is due to bilirubin, a yellow substance formed during the breakdown of red blood cells. Yellowish pigmentation of mucosa is noted in gingiva, soft palate, buccal mucosa, ventral surface of the tongue and floor of the mouth.in case of neonatal jaundice, permanent tooth may appear yellow-green due to intrinsic discoloration due to bilirubin deposition during tooth development.[13]

CONCLUSION:

The yellow lesions of the oral cavity encompass a wide spectrum of physiological and pathological lesions ranging from developmental to neoplastic lesions. The presence of lipid, keratin, pus, bile pigments and keratin give a yellow hue to the lesions and it acts as a diagnostic clue and guide towards specific pathology to narrow down the clinical diagnosis. Any persistent or unusual yellow lesion should be evaluated by a clinician to determine its exact cause and ensure that appropriate management or treatment is provided.

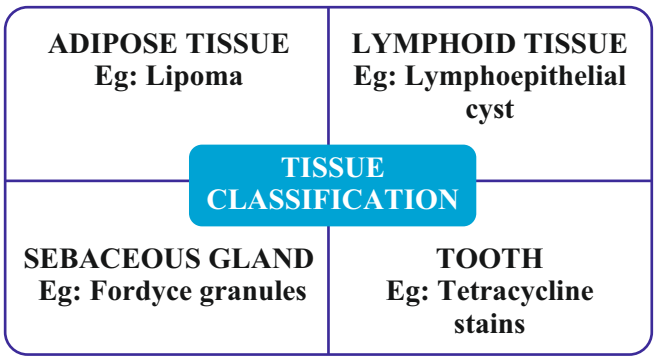

Fig 1:- Classification based on tissue involvement.

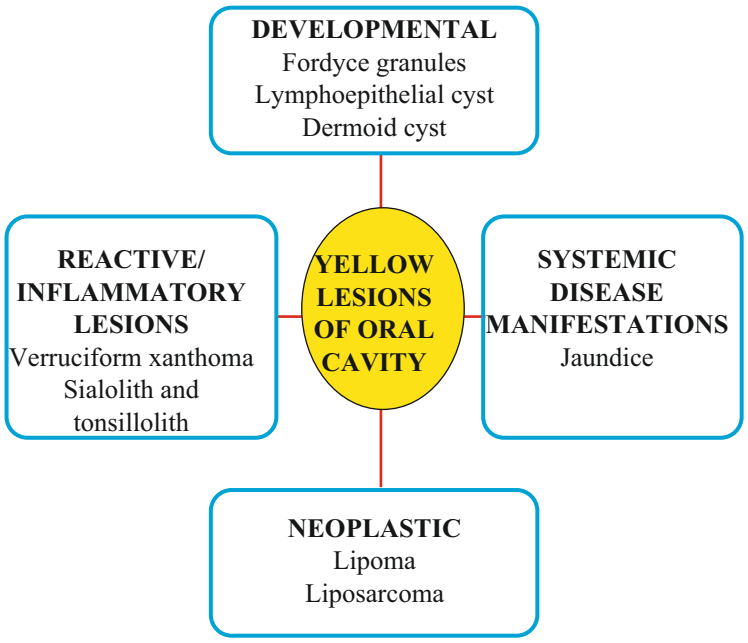

Fig 2:- Working classification of yellow lesions of oral cavity

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Salivaomics and Salivary Biosensors in Paediatric Dentistry: A New Era in NonInvasive Diagnostics

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ABSTRACT

Salivaomics describes the comprehensive analysis of saliva at the genomic, transcriptomic, proteomic, metabolomic, and microbiomic levels which represents a significant advancement in the field of paediatric dentistry. The integration of salivaomics with salivary biosensor technology offers a rapid, accurate and non-invasive approach for the detection of both oral and systemic diseases in children. This review highlights the core domains of salivaomics, outlines the principles and design considerations of salivary biosensor and discusses their potential applications in paediatric dentistry.

Keywords : Salivaomics; Salivary biosensors; Pediatric dentistry; Early childhood caries; Non-invasive diagnostics; Oral microbiome.

INTRODUCTION

Saliva is traditionally appreciated for its role in lubrication, buffering action, remineralization action and antimicrobial protection, is now recognized as a powerful diagnostic medium in pediatric dentistry, where patient compliance and comfort are of utmost importance. Saliva's non-invasive collection offers significant advantages over blood sampling. Advancements in technologies and miniaturized biosensor systems have established saliva as a key medium in personalized pediatric dental care. The integration of salivaomics with biosensor platforms facilitates early disease detection, treatment monitoring and real-time health surveillance in children[1].

SALIVAOMICS: COMPONENTS AND CLINICAL SIGNIFICANCE

Salivaomics encompasses the systematic analysis of the molecular constituents of the saliva which can be broadly categorized into five domains[2].

Genomics focuses mainly on the analysis of host and microbial DNA. Clinically, it facilitates the identification of genetic predispositions, such as mutations linked to enamel hypoplasia, as well as the detection of cariogenic pathogens including Streptococcus mutans[3].

Transcriptomics involves the evaluation of messenger RNA (mRNA) and non-coding RNAs. This domain is clinically significant as it enables early recognition of inflammatory gene expression profiles, which are associated with conditions such as gingivitis and pulpitis.

Proteomics pertains to the quantification of salivary proteins and peptides. Biomolecules such as secretory IgA, lactoferrin, histatins, and cytokines serve as biomarkers, offering valuable insights into host immunity and susceptibility to dental caries.

Metabolomics is associated with profiling salivary metabolites including sugars, organic acids and amino acids. Elevated concentrations of lactic acid, for instance are strongly correlated with increased caries[4].

Microbiomics involves the characterization of the oral microbial ecosystem. The clinical shift in the composition of microbial community or dysbiosis,

have been linked to early childhood caries and pediatric gingivitis.

Salivary Biosensors: Principles and Designs

A biosensor is an analytical device which is designed to detect biological molecules and convert them into quantifiable signals. Salivary biosensors can be broadly classified into electrochemical systems and optical systems. Electrochemical system measures the ionic or molecular changes and are particularly useful for detecting glucose or ions. Optical systems, which employs fluorescence or colorimetric methods for the rapid identification of specific biomarkers and microfluidic "lab-on-a-chip" platforms, which enable multi-marker testing from minimal saliva volumes.

For pediatric applications, biosensors are designed with child-friendly features, including the requirement of very small sample volumes (typically less than 100 µL). It is a non-invasive and comfortable collection method with usage of absorbent strips, that has the ability to provide rapid chairside results, often within minutes[5].

Applications in Pediatric Dentistry

The integration of salivaomics with biosensor technology has expanded diagnostic capabilities in pediatric dentistry, supporting early disease detection, preventive care, and systemic health monitoring[6].

Early Childhood Caries (ECC) and Feeding Practices

Salivaomics provides valuable insights into the risk assessment and management of early childhood caries (ECC). Biosensors targeting Streptococcus mutans DNA or assessing acidogenic activity have been shown to identify children at high risk for early childhood caries. In addition to this in metabolomic profiling elevated lactic acid levels will correlates strongly with active disease. Feeding behaviors such as prolonged bottle feeding and frequent nighttime feeding further influences salivary microbial and metabolic profiles, promoting cariogenic dysbiosis. Salivary bio-sensors integrating microbiome and metabolome data enable clinicians to design individualized preventive strategies tailored to a child's caries risk[7].

Dental Caries Detection and Progression Monitoring

Beyond risk assessment, salivaomics supports the direct detection of active dental caries. Salivary proteins such as secretory immunoglobulin A (sIgA), lactoferrin, histatins along with microbial and metabolic markers, have been associated with ongoing carious activity. Biosensor-based integration of proteomic and metabolomic data offers clinicians reliable, objective means to track disease progression and assess the impact of preventive or restorative treatments[8].

Oral Infections and Halitosis

Salivary diagnostics are increasingly being applied to the detection of bacterial, viral, and fungal infections in children. For example, the identification of Candida species or viral shedding in saliva offers non-invasive alternatives to traditional sampling. In pediatric halitosis, biosensors detecting volatile sulfur compounds (VSCs) and microbial dysbiosis provide objective assessment of malodor, guiding more precise therapeutic interventions.

Systemic Disease Screening

Salivary biosensors also have significant potential for non-invasive systemic disease detection. Glucose biosensors show strong correlation with blood glucose levels in children with type 1 diabetes. Similarly, salivary anti-transglutaminase IgA has been explored as a biomarker for celiac disease, while electrolyte monitoring offers supportive diagnostic value in cystic fibrosis. The application of salivaomics in systemic health represents a paradigm shift toward integrating dental and medical diagnostics[9].

Orthodontic Monitoring

Salivary biomarkers also provide clinical value in orthodontic care. Stress-related markers such as cortisol can be monitored to assess a child's physiological adaptation to orthodontic appliances. Additionally, metabolomic profiling offers the potential to detect demineralization around

orthodontic brackets in its earliest stages, thereby preventing white spot lesions and irreversible enamel damage[10].

DRUG MONITORING

Saliva is increasingly recognized as a reliable matrix for therapeutic drug monitoring in children. Biosensors have been developed to detect salivary concentrations of anticonvulsants, antibiotics, and analgesics, which often correlate well with plasma levels. Such tools enable non-invasive, real-time monitoring of drug compliance and dosage optimization, reducing the risk of adverse drug reactions in pediatric populations.

Other areas of application include monitoring oral mucosal diseases such as recurrent aphthous stomatitis and viral gingivostomatitis, assessing enamel developmental defects through genomic and proteomic analysis and measuring salivary fluoride concentrations to evaluate topical fluoride exposure. In pediatric oncology, changes in salivary proteomic and microbiomic profiles during chemotherapy can serve as indicators of treatment related toxicity. Furthermore, stress and neurodevelopmental conditions including dental anxiety and autism spectrum disorder may be monitored through biomarkers such as cortisol and alpha-amylase.

CONCLUSION:

Salivaomics, combined with biosensor technology, offers a non-invasive, rapid and accurate diagnostic platform for pediatric dentistry. It enables early detection of caries, periodontal disease and orthodontic complications, while also supporting drug monitoring and systemic disease screening. The minimal sample requirements and child-friendly design of salivary biosensors make them particularly suited for pediatric care. As these technologies continue to advance, their integration into routine practice holds great promise for personalized, preventive and holistic dental management in children.

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Indian Dental Association
Bengaluru Branch

CDE PROGRAMS CONDUCTED IN JULY -AUGUST 2025 in association with IDA Bangalore Branch – By Convener Dr. Smitha T

1) Onco sciences update; CDE program conducted in collaboration with Manipal hospital, old airport road on 27th July 2025 at the Ritz Carlton, Bangalore. Speakers were Dr. Amit Rauthan, Dr Amit Rauthan, Dr Hemanth GN, Dr Sasikumari N, Dr Srimanth BS, Dr Vadhiraja BM, Dr Mallikarjun Kalashetty, Dr Srinivas K.

2). In association with cytecare organized CDE program on oral cancer on 2nd august 2025 at Raddison Blu Hotel, Atria, Bangalore. Eminent speakers being Dr Ankita Saraf, Dr Nadimal Hoda, Dr Akshay Kadpaje.

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IDA Bengaluru Branch, Camp Report : MAY - AUG - 2025
CDH Convenor Dr. Akshay V

LIST OF CAMPS CONDUCTED BY VARIOUS DENTAL COLLEGES IN BENGALURU

1. **CDH – 54/2025** – Screening Camp conducted at CB BHANDARI HIGH SCHOOL, KILARI ROAD, BENGALURU on 28-07-2025 by the Dept. of Public Health Dentistry, Bangalore Institute of Dental Sciences & Hospital.

   Patients screened: 861

2. **CDH- 55/2025** – Treatment Camp conducted at NIVEDITA SCHOOL, BENGALURU on 28-07-2025 by the Dept. of Public Health Dentistry, V.S. DENTAL COLLEGE & HOSPITAL

   Patients screened: 24, Topical Fluoride application – 24.

3. **CDH – 56/2025** – Treatment Camp conducted at CB BHANDARI HIGH SCHOOL, KILARI ROAD, BENGALURU on 30-07-2025 by the Dept. of Public Health Dentistry, Bangalore Institute of Dental Sciences & Hospital.

   Oral Prophylaxis – 162, Restoration – 27.

4. **CDH – 57/2025** – Screening Camp conducted at Government school, Chikkabanahalli, Sannatammanahalli, Bengaluru on 01-08-2025 by the Dept. of Public Health Dentistry, Vydehi Institute of Dental Sciences, Bangalore

   Patients screened: 65, Tooth paste samples distributed - 43

5. **CDH – 58/2025** – Screening Camp conducted at The Kids Garden Montessori, Wilson Garden, Bengaluru on 06-08-2025 by the Dept. of Public Health Dentistry, Bangalore Institute of Dental Sciences & Hospital.

   Patients screened: 44

6. **CDH – 59/2025** – Screening Camp conducted at Meraj English School, Someshwarnagar, Bengaluru on 07-08-2025 by the Dept. of Public Health Dentistry, Bangalore Institute of Dental Sciences & Hospital.

   Patients screened: 120

7. **CDH – 60/2025** – Treatment Camp conducted at Bismillah Masjid, 1st Main, Sadduguntepalya, Bengaluru on 10-08-2025 by the Dept. of Public Health Dentistry, Bangalore Institute of Dental Sciences & Hospital.

   Screened – 97, Oral Prophylaxis – 67, Restoration – 05

8. **CDH – 61/2025** – Screening Camp conducted at Cresent High School, Basavangudi, Bengaluru on 11-08-2025 by the Dept. of Public Health Dentistry, Bangalore Institute of Dental Sciences & Hospital.

   Patients screened: 89

9. **CDH – 62/2025 –** Screening Camp conducted at Little Millennium Preschool, Wilson Garden, Bengaluru on 12-08-2025 by the Dept. of Public Health Dentistry, Bangalore Institute of Dental Sciences & Hospital.

   Patients screened: 52

10. **CDH- 63/2025 –** Treatment Camp conducted at Vokkaligara Sangha Primary School, Kottigepalya, Srigandhakavalu, Bengaluru on 20-08-2025 by the Dept. of Public Health Dentistry, V.S. DENTAL COLLEGE & HOSPITAL

    Patients screened: 194, Topical Fluoride application – 25, Oral prophylaxis - 10

Indian Dental Association
Bengaluru Branch

OTHER ACTIVITIES

IDA Bengaluru branch in association with IDA Karnataka state celebrated 79th Independence Day with the chief guest being Mr Priya Krishna MLA {Govindraj nagar} at Danta Bhavana, Chandra Layout, Bangalore on 15th August 2025.

Indian Dental Association
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OTHER ACTIVITIES

Conducted IDA-EC cup box cricket at Flick N Kick, near Ambedkar Institute of Technology, Mallathalli on 15th August 2025

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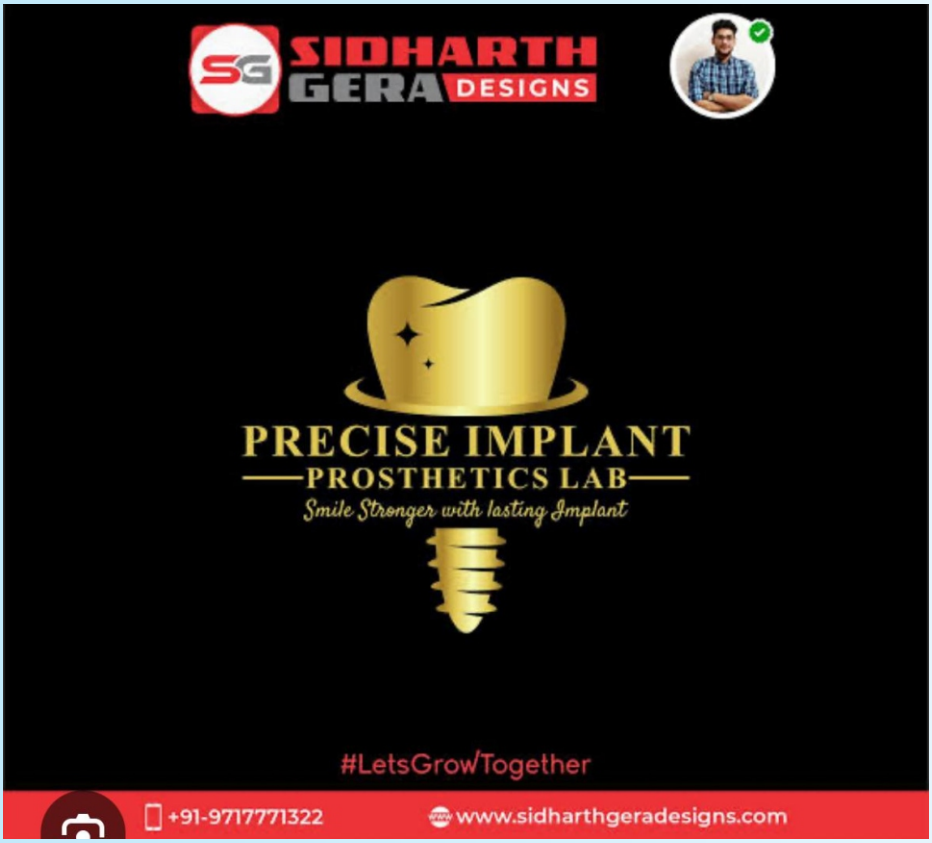

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