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Oral Lichen Planus: A Clinical Puzzle in Evolution – A Review Article.

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ABSTRACT

Introduction: The oral cavity serves as a mirror of systemic health, often displaying early manifestations of systemic diseases. Among these, Oral Lichen Planus (OLP) is a chronic mucocutaneous inflammatory condition that primarily affects the stratified squamous epithelium of the oral mucosa, and may also involve the skin, scalp, nails, and vaginal mucosa. OLP is considered a potentially malignant disorder with a higher prevalence in middle-aged females, especially between the ages of 30 and 60. In the Indian population, the prevalence is estimated between 0.1% and 1.5%. Early diagnosis and a clear understanding of its pathogenesis are essential for effective management.

Sources: Relevant literature was identified using databases such as PubMed, Scopus, and Google Scholar. Keywords included "oral lichen planus," "pathophysiology," "clinical features," and "treatment." Articles published in English over the last 20 years were prioritized, along with authoritative guidelines from dermatology and oral medicine associations.

Study Selection: Original research, systematic reviews, and consensus guidelines focusing on the epidemiology, etiology, clinical manifestations, diagnostic approaches, and management strategies of OLP were included. Studies examining immune-mediated mechanisms and histopathological findings were given particular importance.

Conclusion: OLP involves both antigen-specific immune responses — notably, CD8+ cytotoxic T cell activation — and non-specific mechanisms such as mast cell degranulation and matrix metalloproteinase activity. Clinically, it presents with reticular, erosive, atrophic, or plaque-like lesions, often accompanied by burning sensations. Although benign in many cases, OLP carries a small risk of malignant transformation, necessitating long-term follow-up and biopsy of suspicious areas.

Clinical Significance: Understanding the multifactorial nature of OLP enhances diagnostic accuracy and enables tailored

therapeutic approaches. Early recognition through oral examination allows for timely intervention, symptom relief, and reduction of malignant potential, making OLP a significant condition in both dental and medical practice.

KEYWORDS: *HHV-6, VZV, EBV, lichen planus, oral lichen planus, aetiology, and treatment.*

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1. INTRODUCTION

A chronic inflammatory disease that affects the skin, hair follicles, nails, and mucous membranes is called lichen planus.[1]. The esophageal, vaginal, ophthalmic, and otic surfaces are among the mucosal regions that are frequently impacted.. In rare cases, it may also involve the bladder, nasal passages, larynx, and anal regionThe skin and oral mucosa are the areas most commonly impacted. [1-2].

A chronic illness with cycles of flare-ups and remissions, oral lichen planus (OLP) requires ongoing symptom treatment and routine monitoring.[3].

Usually self-limiting, skin involvement in lichen planus manifests as violet-colored, itchy papules with Wickham striae, a network of thin white lines on the skin's surface.[4].

Redness, erosions, white reticulated plaques, tissue agglutination, labial resorption, or scarring are some of the symptoms of vaginal lichen planus in females. It manifests in males as papulosquamous, annular lesions on the glans penis[5].

Endoscopic findings includes fragile mucosa, white plaques, redness, ulcers, erosions, and stricture formation[6-7-8].

Epidemiology
The incidence of LP is noticeably higher on the Indian subcontinent. With prevalence ranging by region—0.5% in Japan, 1.9% in Sweden, 2.6% in India, and 0.38% in Malaysia, where it is quite uncommon—it is estimated that 0.5% to 2.0% of the general population are affected. The incidence of LP is highest (13.7%) among smokers and chewers, lowest (0.3%) among non-smokers, and 3.7% higher among those with mixed oral habits[11]. The disease is more common in middle-aged people, especially those between the ages of 30 and 60, and it is more common in women[12]. While OLP can affect children, it is rare. The disease occurs across all racial groups, though some studies suggest Compared to other races, white people have a about five and a half times higher risk of developing LP[13]

Compared to the cutaneous variant, oral lichen planus (OLP) is more prevalent, more chronic, and frequently more difficult to treat[14].

Etiology
Oral lichen planus (OLP) is thought to be immune-mediated, meaning that the body's immune system unintentionally targets the cells lining the mouth. Although the precise cause of this immune response is unknown, a number of factors are thought to be involved in the development of OLP:

- Genetics: Some people may be genetically predisposed to developing OLP.
- Autoimmune illnesses: Individuals who have lupus or rheumatoid arthritis, among other autoimmune conditions, may be more susceptible to OLP.
- Medications: Certain medications, such as beta-blockers, NSAIDs, and antimalarial drugs, have been linked to OLP.
- Dental materials: Some dental materials, such as amalgam fillings, may trigger an allergic reaction that leads to OLP in some people.
- Stress: The onset or worsening of OLP symptoms may be influenced by stress.
- Infections: OLP may be linked to some illnesses, including hepatitis C [Burkett's oral medicine book—12th ed.].

Clinical Features
The five Ps—purple, polygonal, itchy, papules, and plaques—define lichen planus (LP) skin lesions.[15]. LP presents as an eruption affecting both the skin and mucosa, though in rare cases, It may appear only in the nails or mouth cavity.The

condition typically begins with discrete, flat-topped papules measuring between 3 to 15 mm in diameter, which can merge into larger plaques. These lesions are initially red, but they quickly turn violaceous or reddish-purple. Each papule may have a slightly recessed core, and Wickham striae—fine, greyish-white lines—mark the surface.

Although LP lesions can appear anywhere on the skin, they are most frequently seen on the trunk, inner regions of the knees and thighs, and the flexor surfaces of the limbs. They might also show the Köbner phenomenon[16] by developing along traumatising lines. Usually, the face remains unchanged. Although each patient's level of itching differs, it is the main symptom of LP. Some individuals may also experience genital involvement with lesions resembling those on the skin. Additionally, LP can affect the scalp (lichen planopilaris) and nails. In rare instances, it may extend to the larynx, oesophagus, or conjunctiva[17].

Oral Manifestation

Radiating white or grey, velvety, thread-like papules make up lichen planus. These papules generate distinctive lacy patches, rings, and streaks when they are grouped in a linear, annular, or reticular pattern. Similar to Wickham striae on the skin, a little elevated white dot known as "striae of Wickham" is noticed where these white lines connect.[18].

Lesions of oral lichen planus usually show up on both sides and are asymptomatic. The floor of the mouth, palate, tongue, lips, gingiva, and buccal mucosa are where they are most frequently found. Oral lesions can occasionally arise weeks or even months before skin abnormalities do.[19].

There are six traditional clinical presentations for OLP:

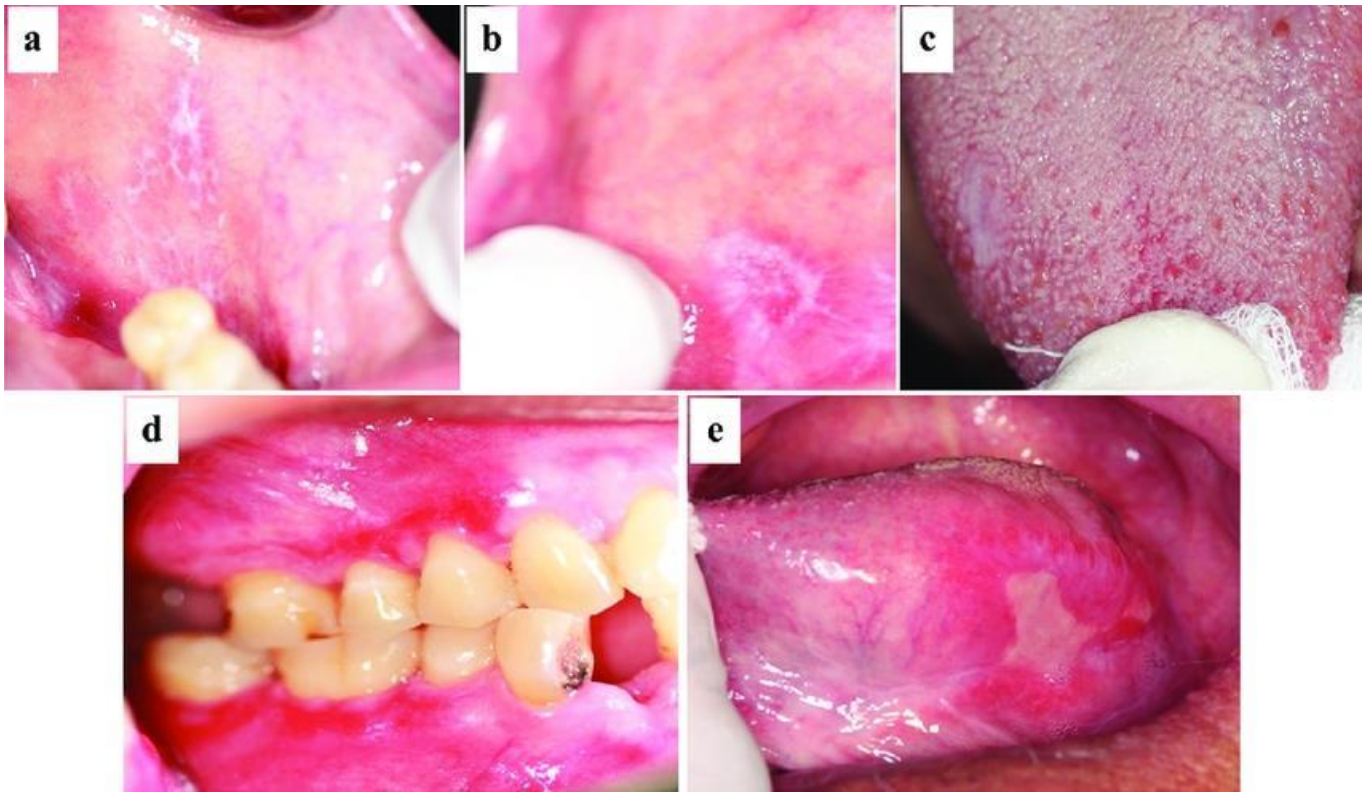

Figure 1 – showing clinical forms of LP . a) Reticular LP b) Papular LP c) Plaque like LP d) Atrophic LP e) Erosive/Ulcerative LP

1. Reticular OLP: The most prevalent type of OLP is distinguished by patterns on the inside of the cheeks, tongue, or gums that are white or greyish, lacy, or web-like. These lesions are usually painless and may not cause any symptoms.
2. Erosive OLP: This form of OLP is characterized by red, inflamed areas with or without ulcerations. Erosive OLP can be painful and may cause sensitivity to hot, spicy, or acidic foods.
3. Atrophic OLP: Atrophic OLP is characterized by thinning of the oral mucosa, which can make the affected area appear red and shiny. This form of OLP can also be painful and may cause sensitivity to certain foods.
4. Bullous OLP: Blisters forming on the oral mucosa is a characteristic of this less prevalent type of OLP. These blisters can rupture and form painful ulcers.

5. Plaque-like OLP: Characterized by whitish, irregular, homogeneous areas resembling leukoplakia, The dorsal surface of the tongue and the cheek mucosa are the main areas affected by this type.
6. Papular OLP: A rare form, usually seen alongside another variant of the disease. It is made up of tiny white papules with delicate striae surrounding them[20].

Pathophysiology

A chronic inflammatory disease that affects the mucous membranes inside the mouth is called oral lichen planus (OLP). OLP is thought to be an immune-mediated disorder, while the precise cause is still unknown. This indicates that the mouth's lining cells are unintentionally attacked by the body's immune system.

* T-cell-mediated immune responseOLP is mostly an autoimmune condition that is mediated by T cells. This indicates that a certain subset of white blood cells known as T-cells is essential to the onset of the illness.
* Keratinocyte apoptosis and CD8+ T cells: In OLP, the basal cells of the oral epithelium (the mouth's lining) are attacked by cytotoxic CD8+ T cells, a subset of T cells. This leads to apoptosis, or programmed cell death, of these cells.
* Antigen presentation: The introduction of an antigen, a material that the immune system perceives as alien, is believed to initiate the process. An antigen that is typically present in the body but is incorrectly recognised as foreign is thought to be a self-antigen in the case of OLP.
* Inflammatory cytokines: The immune response in OLP also involves the release of inflammatory cytokines, which are signaling molecules that promote inflammation. These cytokines contribute to the damage of the oral mucosa seen in OLP.
* Genetic predisposition : Some people may be genetically predisposed to developing OLPThis suggests that they might be more prone to the illness due to specific genes.
* Triggers: Although the precise cause of the immune response in OLP is uncertain, a number of elements are believed to be involved.
* Autoimmune diseases : Individuals who have other autoimmune conditions may be more susceptible to OLP.
* Medications: Certain medications have been linked to OLP.
* Dental materials: Some dental materials may trigger an allergic reaction that leads to OLP in some people.
* Stress : The onset or worsening of OLP symptoms may be influenced by stress.
* Infections: Some infections may be associated with OLP [Textbook of Oral Medicine—Ghom—4th edition].

Histopathology

Regions of hyperkeratosis or hyperorthokeratosis, frequently characterised by a thickening of the granular cell layer and rete pegs that resemble sawtooths.

• The basal cell layer may exhibit liquefaction degeneration or necrosis; an eosinophilic band, which is fibrin covering the lamina propria, may be observed just under the basement membrane.
• The epithelial connective tissue interface is weakened by the degeneration of basal keratinocytes and the disruption of the anchoring elements of the epithelial BM and basal keratinocytes (such as hemi desmosomes, filaments, and fibrils). This can result in the development of histologic clefts (Max-Joseph spaces) and blisters on the oral mucosa (bullous lichen planus) upon clinical examination.[Burkett’s oral medicine—12th edition].

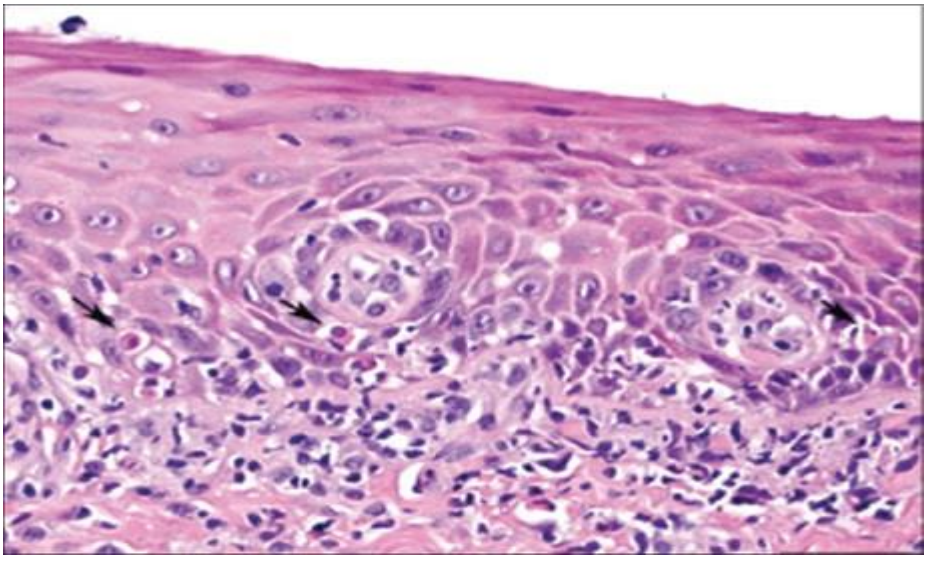

FIG- 2

Evaluation

A precise assessment of oral lichen planus (OLP) requires a comprehensive assessment, including a detailed patient history, clinical examination, and histopathological analysis. In cases where the reticular form of OLP is present, the distinct clinical appearance may be sufficient for diagnosisTo confirm the diagnosis and rule out any indications of dysplasia or cancer, an oral biopsy is advised. [21].

Direct immunofluorescence (DIF) can be required for individuals with desquamative gingivitis in order to distinguish OLP from autoimmune vesiculobullous illnesses that have similar clinical features.[22].

2. MANAGEMENT

Oral lichen planus (OLP) has no known cure, and the primary objective of treatment is to lessen inflammation and alleviate symptoms.

The first line treatment involves topical corticosteroids, which can be given as a mouthwash or gel. Due to the fact that they are more efficient and less harmful than systemic medications, topical treatments are recommended. Despite the widespread use of triamcinolone acetonide gel, stronger Clobetasol propionate and other corticosteroids are often more effective in relieving symptoms.[23].

To guarantee adequate contact time with the mucosa, patients applying topical gel are recommended to dry their oral mucosa prior to administration and refrain from eating or drinking for 30 minutes afterward.

Patients with extensive oral lesions or lesions that are challenging to reach with a gel will benefit most from mouth rinses like dexamethasone.

Intralesional corticosteroid injections can be a possibility for persistent erosive OLP. Topical or systemic antimycotics may be required as an adjuvant treatment for oropharyngeal candidiasis, a typical adverse effect of corticosteroid topical.

The primary usage of systemic corticosteroids is for OLP that does not improve with topical treatments, for severe cases with extensive ulceration and erythema, or when OLP involves areas outside the mouth. The dosage of systemic corticosteroids can be reduced as symptoms improve[23].

When topical corticosteroids are ineffective for OLP, second-line treatments may be employed. These consist of retinoids, calcineurin inhibitors (like tacrolimus and cyclosporine), steroid-sparing medicines (like hydroxychloroquine and azathioprine), or mycophenolate mofetil. Retinoids and cyclosporines frequently cause a transient burning sensation as a side effect, which may restrict their application in patients with erosive OLP.

Tacrolimus is one of the more recent calcineurin inhibitors that should be used carefully because of an FDA black box warning on increased risk for squamous cell carcinoma and lymphoma[23]. Pregnant people should not take retinoid since it may have teratogenic consequences. Steroid-sparing medications like hydroxychloroquine and azathioprine should be used with caution due to the potential for retinal damage and bone marrow aplasia, respectively.

Dental care

In order to reduce the incidence and severity of oral lichen planus (OLP), it is imperative to maintain proper oral hygiene. Patients should be counselled on ways to prevent additional discomfort, such as the use of soft-bristled toothbrushes and non-abrasive toothpaste, as lesions close to the gingival crest can make oral hygiene uncomfortable. Potential OLP triggers, such as dental materials or certain drugs, should be investigated, and any appliances that irritate the mucosa, fractured teeth, or dental restorations should be modified. Treatment is usually not necessary for asymptomatic patients, particularly those with reticular OLP, although it is usually necessary for erosive and atrophic types.[24].

Interventions based on plants

Aloe Vera

When it came to treating oral lichen planus (OLP), aloe vera gel was found to be noticeably more effective than a placebo, improving both clinical symptoms and general health.[25].

Lycopene

Tomatoes and other vegetables contain lycopene, a red pigment with antioxidant qualities that aid in scavenging free radicals.

Antioxidants
Some patients cannot use conventional steroid treatments due to systemic health conditions, rendering dietary flavonoids, anthocyanins, and antioxidants potentially advantageous.

Alternative treatments
OLP has been treated with a variety of techniques, such as Cryotherapy, CO2 laser, ND:YAG laser, and surgical excision .Usually, surgery is only used to remove high-risk dysplastic regions.

After psoralen is administered, a more recent method called photochemotherapy uses ultraviolet A (UVA) light (320–400 nm). Furthermore, by reducing and harmonising the inflammatory response, relaxation methods like meditation and hypnosis have been shown to have a good impact on a variety of skin problems, including inflammatory skin illnesses.

Differential Diagnosis
On both a clinical and histological level, a number of disorders resemble oral lichen planus (OLP[5]). These include lupus erythematosus, oral lichenoid medication reactions, oral lichenoid contact hypersensitivity reactions, mucous membrane pemphigoid, proliferative verrucous leukoplakia, chronic ulcerative stomatitis, and oral epithelial dysplasia[26].

Oral lichenoid drug responses are most commonly associated with medications such as non-steroidal anti-inflammatory drugs (NSAIDs), antihypertensives, anticonvulsants, antimalarials, and antiretrovirals.Oral hypoglycemics, dapsone, gold salts, penicillamine, and phenothiazines are among the other medications that have been linked.

These lichenoid reactions brought on by drugs may not show up right away; they might sometimes take years to manifest.Diagnosed them can be challenging, making a detailed clinical history crucial in identifying the causative drug. While discontinuing or substituting the medication is not always necessary, consulting the prescribing physician may help assess alternative options and monitor lesion resolution, which can take several months[26].

Hypersensitivity reactions to oral lichenoid contact usually happen on mucosal surfaces that are in close proximity to the trigger. Dental restoratives including metals, composites, and glass ionomer cement, as well as flavourings like eugenol, menthol, and cinnamon, are frequently the perpetrators. Amalgam restorations are especially linked to these responses.. The lesions generally resolve within a few months after replacing the dental material or discontinuing the offending agent.

3. PATIENT EDUCATION AND DETERRENCE

Patients with OLP should be informed that treatment focuses on symptom management rather than a cure. Avoiding triggers like acidic or spicy foods can help reduce discomfort. Addressing potential aggravating factors, such as smoothing sharp teeth or dental restorations, along with educating patients on maintaining good oral hygiene and managing stress, is also essential[3].

Talking about the possible possibility of malignant transformation is crucial to stress the need for ongoing clinical monitoring. Early detection may be facilitated by urging patients to regularly check themselves for any concerning changes, like ongoing mouth ulcers or unusual growths.

4. CONCLUSION

The clinical illness known as oral lichen planus (OLP) is complicated, poorly understood, and incurable. Careful, diligent follow-up and a conclusive diagnosis are essential. Common and difficult to manage, symptoms and complications can be controlled with a range of treatments, including as systemic and oral medicines, lifestyle changes, and lowering risk factors. [Burket's 12th edition of Oral Medicine].

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