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## **A visual clues to risk-literature review on clinical signs of oral lesions**

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### **Abstract**

This literature review explores clinical signs of oral lesions that serve as visual clues to systemic or localized diseases. It categorises lesions based on clinical appearance such as ulceration, discolouration, swelling, and pigmentation. These features reflect deeper pathological processes involving immune, genetic, or inflammatory mechanisms. Recognising such clues aids in early identification and appropriate management. Overall, it highlights the value of visual diagnostic in primary care settings.

**Keywords:** Swelling, discoloration, ulceration, pigmentation

### **1. Introduction**

#### **1. Pemphigus Vulgaris**

Pemphigus vulgaris is a rare autoimmune disease that causes blistering on cutaneous and mucosal surfaces.

#### **Nikolsky's Sign**

Nikolsky's sign is a sign which is formed when slight rubbing of the unaffected skin results in disruption of epidermal layer from the affected site. Nikolsky's sign has different types, include the "wet Nikolsky's sign" and "dry Nikolsky's sign. This occur when (IgG) Autoantibodies attack desmogleins (DSg)3 or (DSg)1 which induce loss of adhesion between keratinocytes, a phenomenon called "acantholysis" [1].

#### **2. Oral Lichen Planus**

Oral lichen planus is a common mucocutaneous disease, it can affect either the skin or mucosa or both.

#### **Wickham's Striae**

Wickham striae is a sign which is formed when there is hypergranulosis of the epithelium and it appears as fine, white, lacy lines on the lesion's surface. Cytotoxic CD8+ T cells induce keratinocyte apoptosis, while TNF- $\alpha$  and IFN- $\gamma$  sustain inflammation and degrade the basement membrane [2].

#### **3. Cherubism**

Cherubism is a peculiar genetic disease affecting the jaw bones of children.

#### **Eyes upturned to heaven**

This sign is formed when tonic contraction of extraocular muscles causes the upward deviation of the eyeballs. It is caused by autosomal dominant trait with mutation in gene coding (SH3BP2) located at chromosome 4P16.3 [3].

#### **4. Fibrous Dysplasia**

Fibrous dysplasia is a benign bone disorder characterised by the pathological replacement of normal bone with fibro-osseous tissue.

### Shepard Crook Sign

Shepherd's crook sign is formed when the proximal femur bends into a curved shape resembling a shepherd's staff. It is caused by a postzygotic somatic mutation in GNAS1 gene, located at chromosome 20q13.2 leading to overproduction of cyclic AMP <sup>[4]</sup>.



Source: Sciencephotolibrary [internet]

**Fig 1:** Clinical image Pemphigus vulgaris lesions.



Source: Statpearls [internet]

**Fig 2:** Clinical image Wickham's striae lesions.



Source: Research Gate [internet]

**Fig 3:** Clinical image eyes turned to heaven lesions.



Source: Research gate [internet]

**Fig 4:** Clinical image Shepherd crook sign lesions.

### 5. Taurodontism

Teeth with enlarged pulp chambers and root bifurcation or trifurcation displaced toward the apex.

### Bull's Tooth

Bull's tooth is a sign which is formed when there is defective development of enamel and dentin, as seen in regional odontodysplasia. It is caused by failure of Hertwig's epithelial sheath to invaginate at the proper horizontal level. This results in hypoplastic, hypomineralized teeth with large pulp chambers and thin dentinal walls <sup>[5]</sup>.



Source: Dentagama [Internet]

**Fig 5:** Clinical image bull's tooth lesions.

### 6. Systemic Lupus Erythematosus

Systemic lupus erythematosus (SLE) is a systemic autoimmune disease with multisystemic involvement characterized by autoantibodies especially against nuclear components.

**Malar Rash:** It is a red or purplish rash that appears over both cheeks and across the bridge of the nose, forming a butterfly-like shape. Genetic and environmental factors can impair the clearance of apoptotic cells, leading to the exposure of nuclear antigens. This triggers autoimmune responses, resulting in immune complex deposition and inflammation affecting multiple organ systems <sup>[6]</sup>.



Source: Solmed [Internet]

**Fig 6:** Clinical image Malar rash lesion.

### 7. Discoid Lupus Erythematosus

It is a chronic, scarring, atrophy producing photosensitive dermatosis. The typical oral DLE lesion is a well demarcated lesion with a mixed centre and with brush border of fine striae around the lesion.

### Carpet Tack Extensions

It is a sign which is formed when keratotic plugs adhere to the undersurface of skin scales, when scales are removed, these horny plugs resembling carpet tacks. It is also known as “cat’s tongue sign” or “tin tack sign”. It is caused by follicular hyperkeratosis with keratotic plugs [7].



**Fig 7:** Carpet tack extensions lesion. Source:

### 8. Scleroderma

Systemic sclerosis (scleroderma, SSc) is a connective tissue disease characterized by overproduction and deposition of collagen and leads to progressive fibrosis of the skin and internal organs.

### Acro Osteolysis

Acro-osteolysis also known as phalangeal osteolysis is the osseous destruction of the hand or foot distal phalanges. Endothelial injury leads to narrowed blood vessels and

impaired tissue perfusion, often causing Raynaud’s phenomenon. Cytokines like TGF- $\beta$  and IL-6 activate fibroblasts, resulting in excess collagen deposition in the skin [8].



**Fig 8:** Acro osteolysis.

### 9. Tuberous Sclerosis

Tuberous sclerosis is a rare genetic disorder that causes noncancerous (benign) tumors to grow in various parts of the body-including the brain, skin, kidneys, heart, lungs, and eyes.

**Ash Leaf Spots:** Fine wart like lesion (adenoma sebaceum) occur in a butterfly distribution over the cheeks and forehead, and it is caused by mutations in TSC1 or TSC2 proteins that form a complex to regulate the mTOR pathway [9].



**Fig 9:** Ash Leaf Spots Lesion. Source:

### 10. Erythema Multiforme

Erythema multiforme is an immune-mediated hypersensitivity reaction with cutaneous and mucosal involvement [10].

### Bull’s Eye Lesion

A bull’s-eye lesion, or target lesion, is a sign which is formed when there is central necrosis or blistering, surrounded by concentric rings of erythema and edema. When cytotoxic T cells target keratinocytes, often in response to infections like HSV. This leads to inflammation, apoptosis, and formation of target-like bull’s-eye lesions on mucous membrane.





Source: Hamra Nepali health [Internet]

**Fig 10:** Bull's Eye Lesion.

### 11. Scarlet Fever

It is a contagious systemic bacterial infection occurring predominantly in children and usually associated with sore throat.

#### Strawberry Tongue

Rasperry tongue is characterized by promi prominence of inflamed and hypertrophic fungiform papilla together with hyperamia. It is caused by (GROUP A) Streptococcus pyogenes producing erythrogenic exotoxins. These toxins cause capillary leakage and inflammation, leading to rash and strawberry tongue <sup>[11]</sup>.



Source: mini First aid [Internet]

**Fig 11:** Strawberry tongue lesion.

### 12. Tetany

Tetany is a condition involving involuntary muscle spasms, often caused by low calcium levels.

#### Chvostek Sign

Chvostek sign is a sign which is formed when tapping over the facial nerve could lead to twitching of the ipsilateral facial muscles. It occurs due to decreased ionized calcium levels, which increase neuromuscular excitability <sup>[12]</sup>.



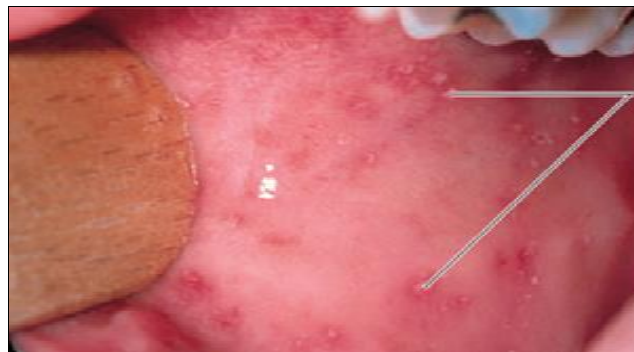
**Fig 12:** Chvostek sign lesion.

### 13. Measles

It is an acute, highly contagious, dermatropic, and endemic viral infection, primarily affecting children.

#### Koplik's Spots

Koplik's spots are tiny bluish-white lesions on a red base found inside the cheeks, often opposite the upper molars. When virus infects and suppresses T lymphocytes, especially CD4+ and CD8+ cells, leading to weakened cell-mediated immunity <sup>[13]</sup>.



**Fig 13:** Kopliks spots lesion. Source:

### 14. Rubella

Rubella, or German measles, is a mild viral infection that typically occurs in children and non-immune young adults.

#### Forchheimer Spots

It is a small petechial lesion which is formed when the rubella virus causes capillary dilation and inflammation in the soft palate. It infects the respiratory epithelium, spreads through lymph nodes and blood (viremia), causing fever and rash <sup>[14]</sup>.



Source: Slideplayer [Internet]

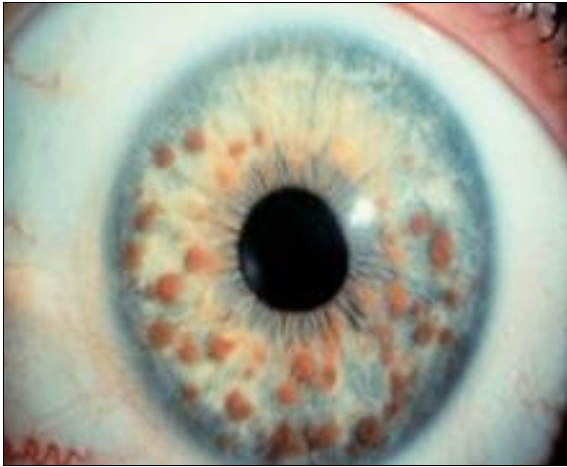
**Fig 14:** Forchheimer spots lesion.

### 15. Neurofibromatosis

It is an autosomal dominant disorder characterized by the development of multiple neurofibromas of the peripheral nerves.

#### Lisch Nodules

Lisch nodules are a sign which is formed when melanocytic hamartomas develop on the iris which is small, yellow brown, dome shaped papules<sup>15</sup>. It is caused by mutations in the NF1 gene on chromosome 17q11.2, which encodes neurofibromin, a tumor suppressor protein. Loss of neurofibromin leads to uncontrolled cell growth <sup>[16]</sup>.



Source: Pinterest [Internet]

**Fig 15:** lisch nodules lesion.

### 16. Pellagra

Pellagra is a nutritional disorder caused by niacin (vitamin B3) deficiency and essential aminoacid Tryptophan which leads to systemic disease <sup>[17]</sup>.

#### Tongue of Sandwich

It appears as a central red, inflamed area bordered by normal or less affected mucosa, resembling a tongue placed between two slices of bread. It is caused by a deficiency of niacin or tryptophan, leading to reduced synthesis of NAD and NADP <sup>[18]</sup>.



Source: Slideserve [Internet]

**Fig 16:** Tongue of sandwich lesion.

### 17. Thalassemia

It is a group of inherited disorders of haemoglobin synthesis leading to reduced portion of globin chains.

#### Chipmunk Facies

It means prominent cheekbones, frontal bossing, and maxillary overgrowth result from bone marrow expansion due to chronic anemia. It is caused by genetic mutations that reduce or eliminate the synthesis of  $\alpha$  or  $\beta$  globin chains of hemoglobin <sup>[19]</sup>.



Source: Quizlet [Internet]

**Fig 17:** Chipmunk facies.

**18. Pernicious Anaemia:** Pernicious anemia is an autoimmune disorder that causes reduced in dietary vitamin B12 (cobalamin) absorption.

**Hunter's Glossitis:** Hunter's glossitis is a sign which is smooth, shiny, bright-red tongue that occurs due to atrophy of the tongue papillae, with burning sensation and soreness. It occurs due to autoimmune destruction of gastric parietal cells, leading to a deficiency of intrinsic factor <sup>[20]</sup>.



Source: byte [Internet]

**Fig 18:** Hunter's glossitis.

**19. Syphilis:** Syphilis is a systemic bacterial infection caused by the spirochete *Treponema pallidum*.

#### Leucic Glossitis

Leucic glossitis is a sign which is formed by chronic inflammation and fibrosis of the tongue due to tertiary syphilis. *Treponema pallidum* uses antigenic variation (e.g., TprK protein) to evade the immune system, enabling persistent infection and invades endothelial barriers via Tp0751 (pallilysin), and can disseminate to the CNS and other organs <sup>[21]</sup>.



Source: Inspired pencil [internet]

**Fig 19:** Leucic glossitis lesion.

## 20. Internal Resorption

Internal resorption is the loss of tooth structure from within the pulp chamber or root canal, which is caused by chronic pulpal inflammation <sup>[22]</sup>.

### Pink Teeth

It is a sign which is formed when vascular pulp tissue shows through the thinned crown, giving a pinkish hue, commonly seen in the cervical region of anterior teeth. Internal root resorption occurs due to pulpal inflammation that activates odontoclasts, leading to progressive dentin loss <sup>[23]</sup>.



Source: blog spot [Internet]

**Fig 20:** Pink teeth.

## 21. Wegener's Granulomatosis

Also known as Granulomatosis with Polyangiitis is a systemic disorder that is characterized by necrotizing vasculitis of small arteries and veins.

**Strawberry Gingivitis:** It is a sign which is formed when there is granulomatous inflammation of the gingiva, leading to red, swollen, and friable gum tissue with a granular surface. It is caused by antineutrophil cytoplasmic antibody formation (ANCA) that activate neutrophils, leading to vascular inflammation and necrotizing vasculitis <sup>[24]</sup>.



Source: Pinterest [Internet]

**Fig 21:** Strawberry Gingivitis lesion.

## 22. Actinomycosis

Actinomycosis is a chronic granulomatous, suppurative and fibrosing disease caused by anaerobic or microaerophilic bacteria.

### Sulfur Granules

Sulfur granules are formed when Actinomyces bacteria aggregate in infected tissue, producing yellowish bacterial colonies surrounded by inflammatory cells and pus. It is caused by Actinomyces species, normal oral flora that become pathogenic when they invade tissue through mucosal breaches <sup>[25]</sup>.



Source: Brown University [Internet]

**Fig 22:** Sulfur granules.

## 23. Ehler Danlos Syndrome

It is an autosomal dominant or recessive inherited disorder of connective tissue matrix result in fragile skin blood vessels and easy bruising <sup>[23]</sup>.

### Gorlin Sign

When an individual is able to touch the tip of the nose with their tongue due to increased connective tissue laxity. It is caused by genetic mutations that impair collagen synthesis or structure, leading to connective tissue weakness and fragility <sup>[26]</sup>.





Source: Web consultas [Internet]

**Fig 23:** Gorlin sign.

## 24. Rhinoscleroma

It is a chronic, slowly progressive, localized infectious, granulomatous disease caused by gram negative nonmotile bacillus [27].

### Hebra Nose

Proliferative nasal masses produce a configuration that may lead to nasal obstruction, deformity, or external swelling. It involves chronic infection by *Klebsiella rhinoscleromatis*, triggering granulomatous inflammation with foamy macrophage formation and progressive fibrotic narrowing of the airways [28].



Source: Wikidoc [Internet]

**Fig 24:** Hebra nose.

## 25. Congenital Syphilis

Syphilis is a life-threatening infectious disease caused by the bacterium *Treponema pallidum* subspecies

### Moon's Molar

Moon's molar is a congenital tooth defect where the molar looks rounded and smooth instead of having normal pointed cusps. When *Treponema pallidum* crosses the placenta and enters the fetal bloodstream, causing widespread inflammation in organs like the liver, spleen, bones, and heart [29].



**Fig 25:** Moon's molar. Source: dentagama [Internet]

## 26. Pemphigus Vegetans

Pemphigus vegetans is an uncommon variant of pemphigus vulgaris characterized by erosions and vegetating plaques.

### Cerebriform Tongue

It is a typical sign which is formed when there is hypertrophy and folding of the tongue mucosa due to verrucous vegetations in pemphigus vegetans. Characterized by grooves or fissures on the dorsal surface of tongue.



**Fig 26:** Cerebriform tongue.

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