

Inflammation (Sialadenitis)

Salivary gland pathology: inflammation, xerostomia, mucocele and ranula

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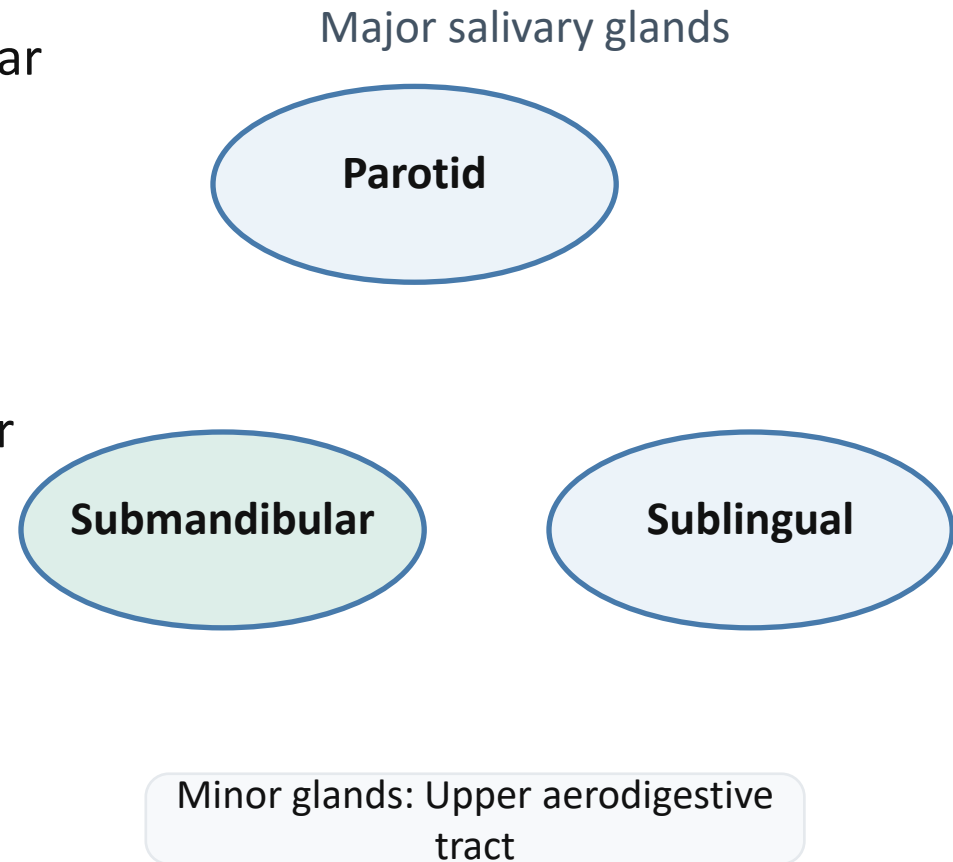
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Learning objectives

- Identify the salivary-gland sites susceptible to inflammatory disease.
- Distinguish traumatic, infectious and autoimmune sialadenitis.
- Explain xerostomia, mucoceles and ranulas through gland and duct pathology.
- Link microscopic structure to clinical presentation and recurrence.

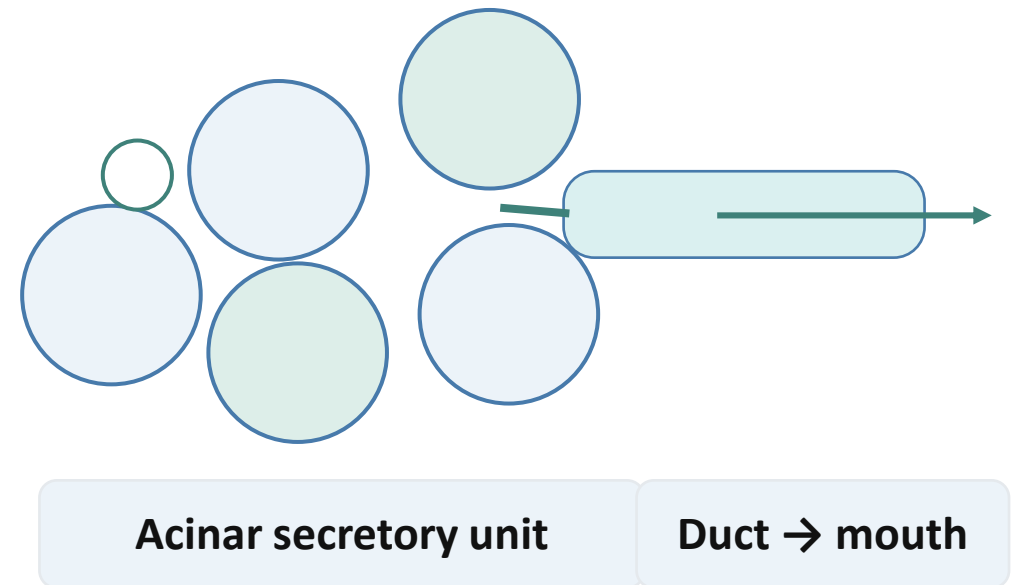
Salivary glands at risk

- Three paired major glands: Parotid, submandibular and sublingual.
- Numerous minor glands occur throughout the upper aerodigestive tract.
- Any of these glands may develop inflammatory or neoplastic disease.



Glands connect secretory tissue to the mouth

- Secretory units form the salivary output.
- Ducts conduct secretions toward mucosal openings.
- Disruption of the outflow pathway can produce a focal mucus collection.



Schematic

Two ways salivary function becomes abnormal

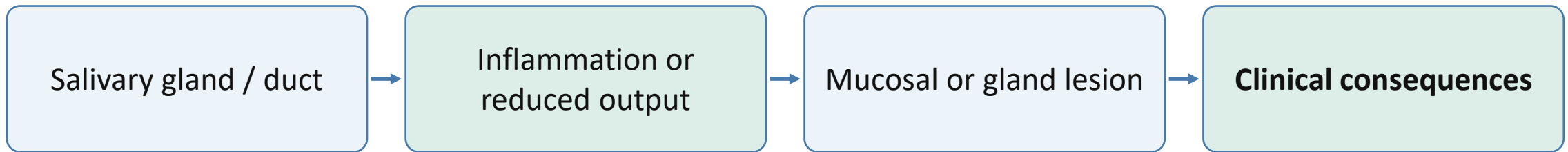
Gland inflammation

- Triggered by trauma, infection or autoimmunity
- May produce gland enlargement
- Can accompany a focal mucocele

Reduced saliva secretion

- Produces xerostomia
- May follow systemic disease, treatment or medication
- Causes mucosal and functional complications

Clinical-pathologic map of this topic



The anatomical compartment affected determines whether dryness, gland swelling or a mucus-filled lesion predominates.

Sialadenitis: Definition and scope

- Sialadenitis means inflammation of salivary glands.
- Trauma, viral infection, bacterial infection and autoimmune disease as causes.
- The presentation depends on which salivary gland and tissue compartment is affected.

Four principal etiologic pathways

Traumatic

Duct damage

Local mucus leakage

Viral

Mumps

Major gland
involvement

Bacterial

Duct-associated
infection

Suppurative
inflammation

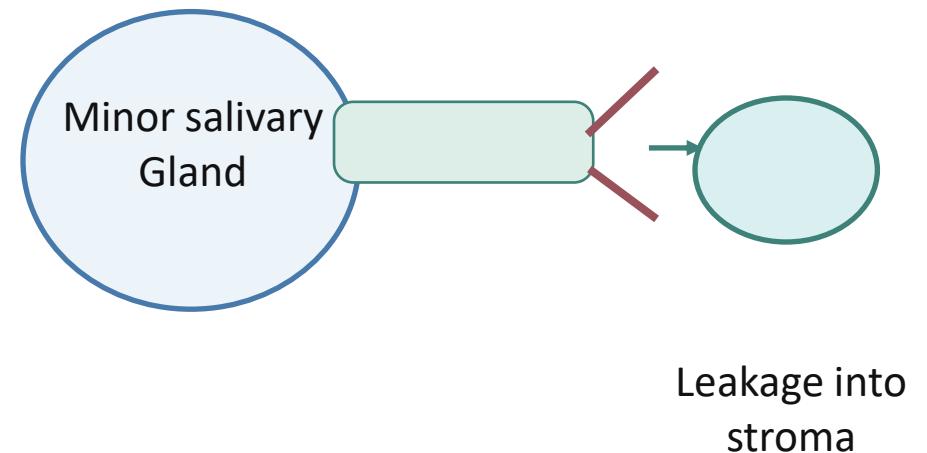
Autoimmune

Sjögren syndrome

Inflammation + dry
mouth

Trauma can injure minor salivary ducts

- Minor glands drain through small ducts to the oral mucosa.
- Local trauma may rupture a duct.
- Escaping saliva accumulates in connective tissue and creates a mucocele.



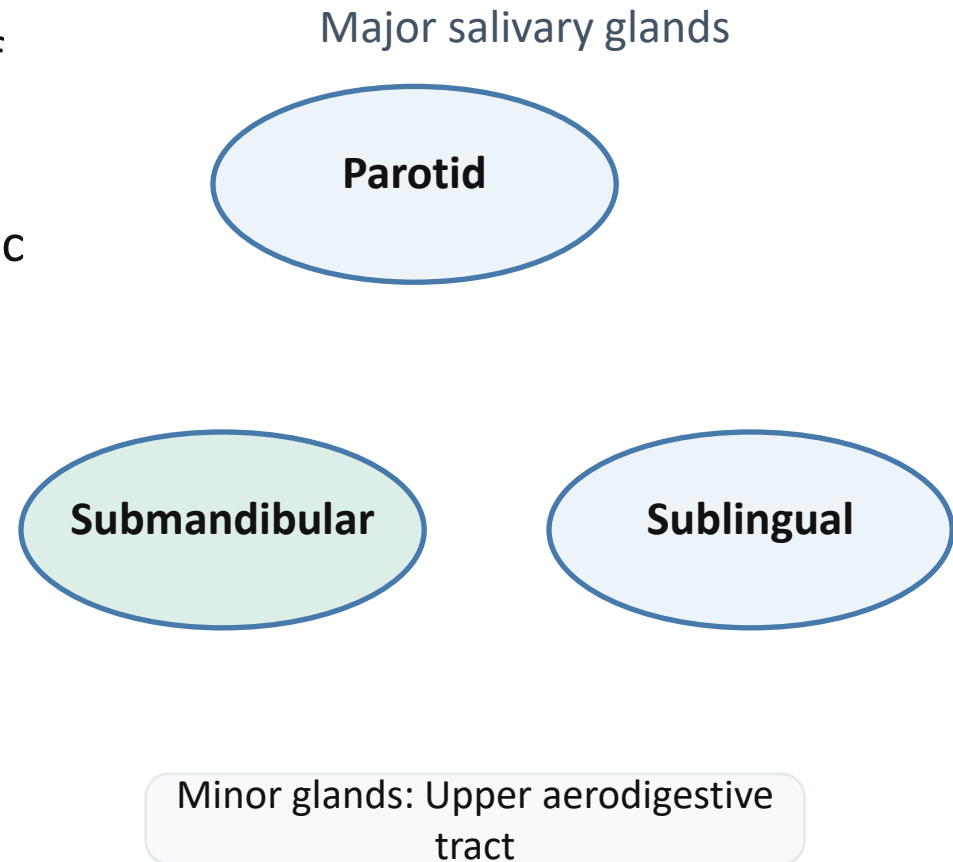
Schematic

The viral exemplar is mumps

- Mumps as the most common viral cause of sialadenitis.
- Mumps characteristically affects major salivary glands.
- The parotid glands are particularly involved.

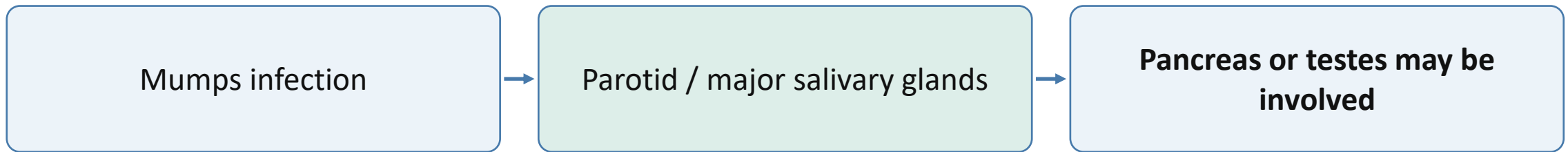
Why the parotid is central in mumps

- Parotid involvement is especially characteristic of textbook-described mumps.
- Salivary swelling is a local expression of a systemic viral illness.
- An inflamed gland should be interpreted in its clinical context.



Mumps can involve other glandular organs

Salivary inflammation is not necessarily confined to the mouth.

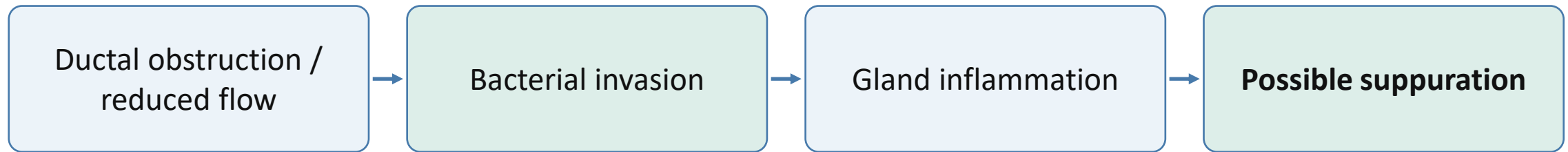


The pancreas and testes are specifically identified by Robbins as common additional sites of glandular involvement.

Bacterial sialadenitis: Adjacent context

- The next Robbins unit discusses bacterial inflammation involving major salivary glands.
- Ductal obstruction and reduced secretions can precede bacterial invasion.
- Pathology may range from interstitial inflammation to suppurative necrosis and abscess.

Bacterial inflammation follows impaired drainage



In adjacent Robbins text, clinical findings include painful unilateral gland enlargement and sometimes purulent ductal discharge.

Autoimmune sialadenitis in Sjögren syndrome

- Sjögren syndrome is the named autoimmune setting in this salivary-gland section.
- Reduced salivary output produces xerostomia.
- Inflammatory gland enlargement may also be present.

Sialadenitis may present in different forms

Diffuse gland process

- Viral parotid involvement
- Autoimmune gland enlargement
- Bacterial inflammation of major glands

Focal duct-related lesion

- Trauma or duct rupture
- Mucus extravasation
- Mucocele in surrounding stroma

Xerostomia means reduced salivary production

- Xerostomia is defined here as a dry mouth caused by decreased saliva production.
- It may be a manifestation of autoimmune disease, treatment or medication exposure.
- Its pathology extends beyond discomfort to mucosal, dental and functional effects.

Xerostomia is relevant in older adults

- That xerostomia may affect as many as 20% of people older than 70 in certain populations.
- This is a source-specific, population-dependent estimate, not a universal prevalence.
- A thorough medication review is especially relevant account.

Major causes of xerostomia

Autoimmune

Sjögren syndrome

Sicca symptoms

Treatment

Head and neck radiotherapy

Reduced gland output

Medication

Many prescribed classes

Frequent cause

Sjögren syndrome links mouth and eye dryness

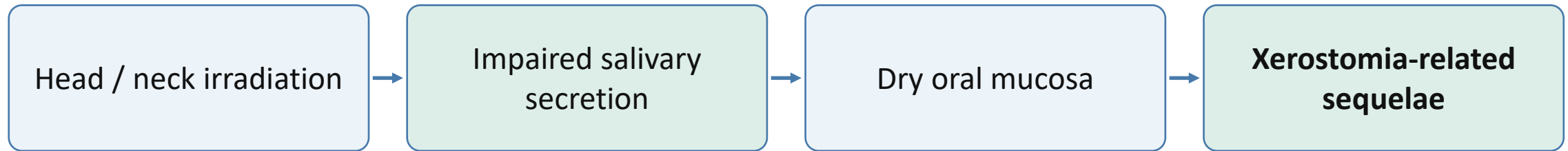
Salivary component

- Decreased salivary secretion
- Xerostomia
- Sometimes gland enlargement

Lacrimal component

- Dry eyes
- Keratoconjunctivitis sicca
- Paired sicca phenotype

Radiotherapy can damage salivary output



Reduced saliva as a major complication of radiation therapy for head and neck cancer.

Medications are a major cause of dry mouth

- Drug effects as the most frequent source of xerostomia.
- The implicated prescriptions belong to several distinct therapeutic classes.
- Do not restrict the history to drugs specifically marketed as anticholinergics.

Medication classes: Autonomic and psychotropic

Autonomic effects

- Anticholinergic medications
- Antihypertensives
- Diuretics

Central nervous system agents

- Antidepressants
- Antipsychotics
- Sedatives

Medication classes: Additional examples

Symptom control

- Analgesics
- Muscle relaxants

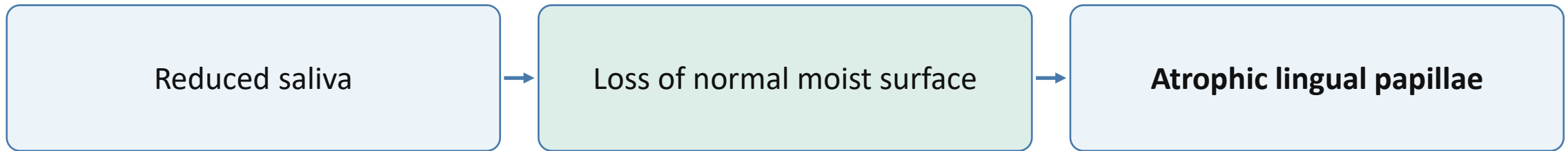
Allergy medications

- Antihistamines
- Assess concurrent use with other causes

Xerostomia: Visible examination findings

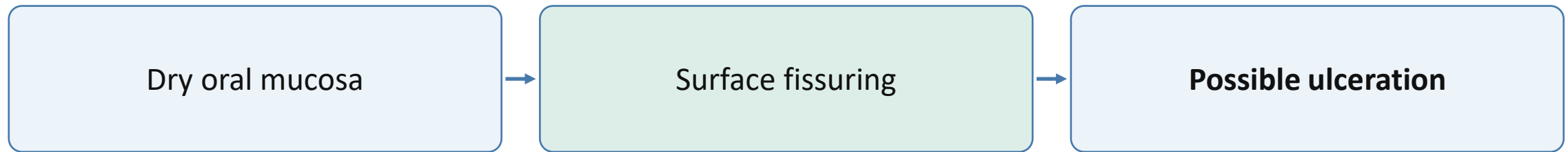
- Dryness of the oral mucosa is a direct clinical sign.
- Atrophy of the tongue papillae may be seen.
- Mucosal fissuring and ulceration may accompany prolonged dryness.

Tongue papillary atrophy is a surface change



The tongue finding provides an examinable correlate of a reduced salivary state; It is not specific for a single cause.

Fissures and ulcers mark mucosal injury

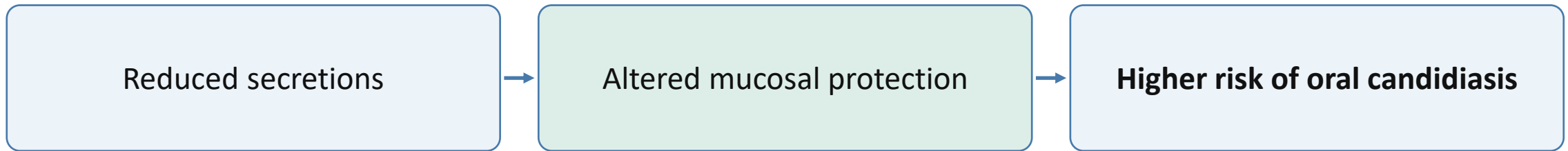


Recognize fissures and ulcers as consequences in the xerostomia description, not as separate primary salivary lesions.

Dental caries is a major consequence

- Inadequate saliva is associated with increased dental caries.
- Saliva normally contributes to a protective oral environment.
- Oral findings should prompt consideration of a salivary cause.

Candidiasis may accompany reduced saliva



Candidiasis is listed among complications of xerostomia.

Swallowing and speaking may be impaired

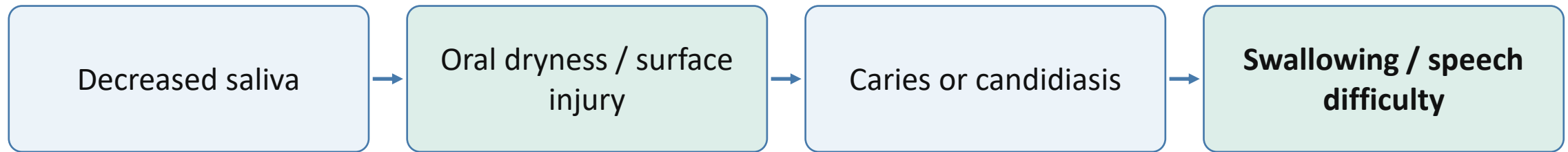
Swallowing

- Saliva helps oral food handling
- Dry mouth creates difficulty swallowing

Speech

- Moist mucosa facilitates oral articulation
- Dryness may interfere with speaking

Xerostomia has a connected complication chain



These outcomes coexist but are not a compulsory stepwise sequence in every patient.

Assess the cause of oral dryness systematically

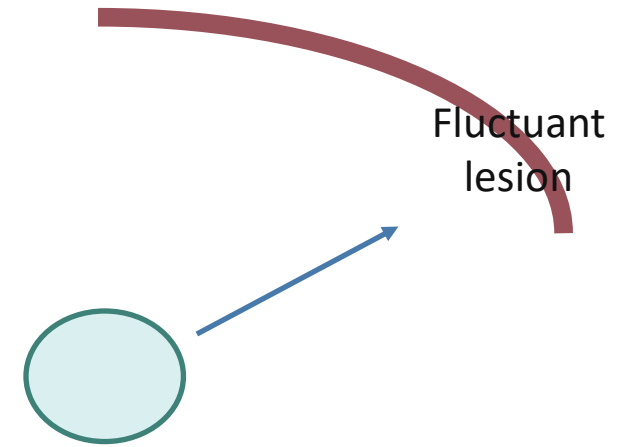
Clinical clue	Source-grounded association
Dry eyes + dry mouth	Sjögren syndrome
Head and neck irradiation	Treatment-related salivary damage
Relevant medication use	Drug-associated xerostomia
Dry tongue, fissures, caries	Consequences of low secretion

Mucocele: A focal saliva-related lesion

- A mucocele is a common manifestation in the sialadenitis section.
- It arises from obstruction or rupture of a salivary duct, with subsequent salivary leakage into surrounding connective tissue.
- Minor glands of the lower lip are a particularly characteristic site.

Lower-lip trauma is a frequent setting

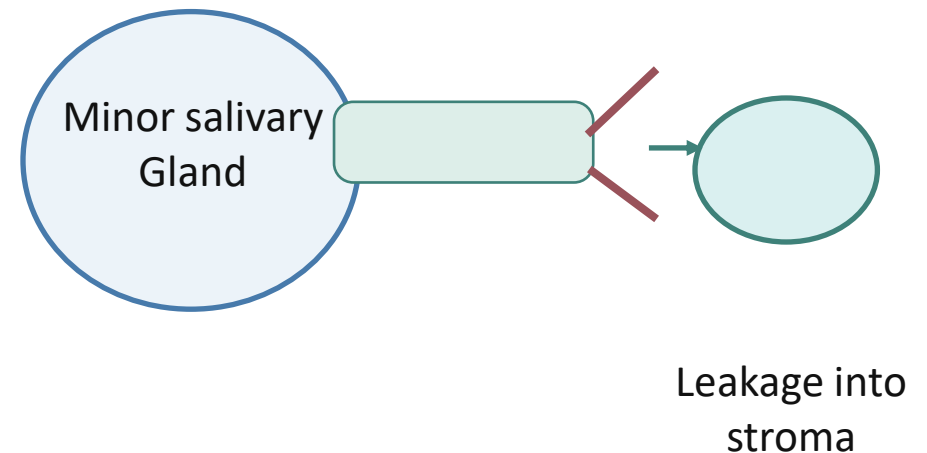
- Most mucoceles on the lower lip.
- They commonly follow local trauma.
- The lesion can occur at any age.



Simplified lower-lip schematic

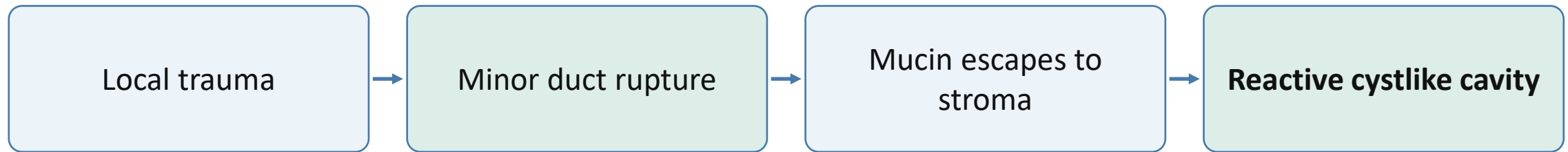
Mucocele begins with duct injury

- Minor salivary glands lie just beneath oral mucosal surfaces.
- Trauma can damage their ductal pathway.
- Escaping secretion dissects into surrounding connective tissue.



Schematic

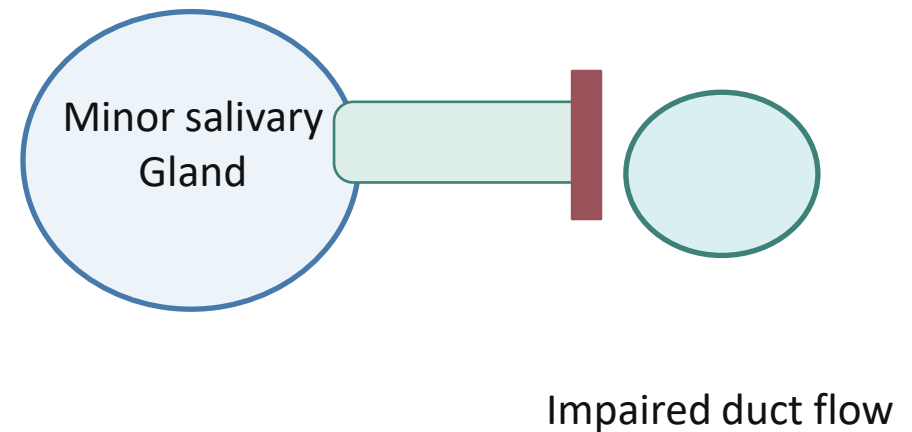
Duct rupture explains mucus extravasation



Extravasated saliva is outside a normal epithelial duct lumen.

Duct obstruction is another described trigger

- Ductal blockage as another initiating event.
- Interference with drainage promotes mucus accumulation.
- The source then describes a stromal, pseudocystic lesion.



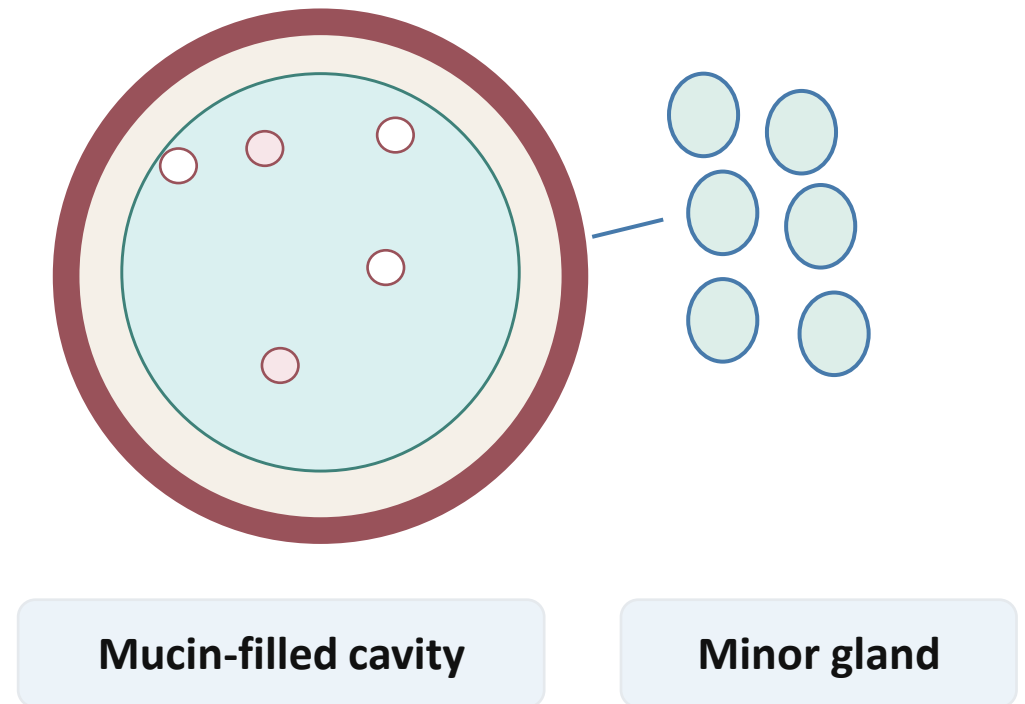
Schematic

The mucocele cavity is not a true cyst

- The classic histologic lesion is a mucus-filled pseudocyst.
- Its boundary is formed by granulation tissue or fibrous connective tissue.
- A continuous epithelial cyst lining is not present in this model.

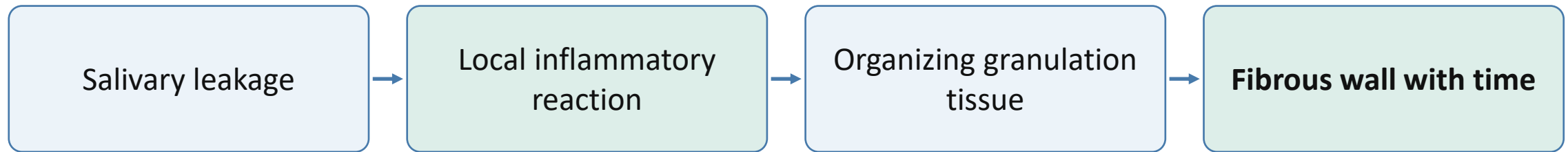
Pseudocyst architecture: Low-power reasoning

- A cavity occupies connective tissue adjacent to a minor gland.
- Mucinous contents occupy the central space.
- A reactive connective tissue wall encircles the collection.



Schematic, not histology

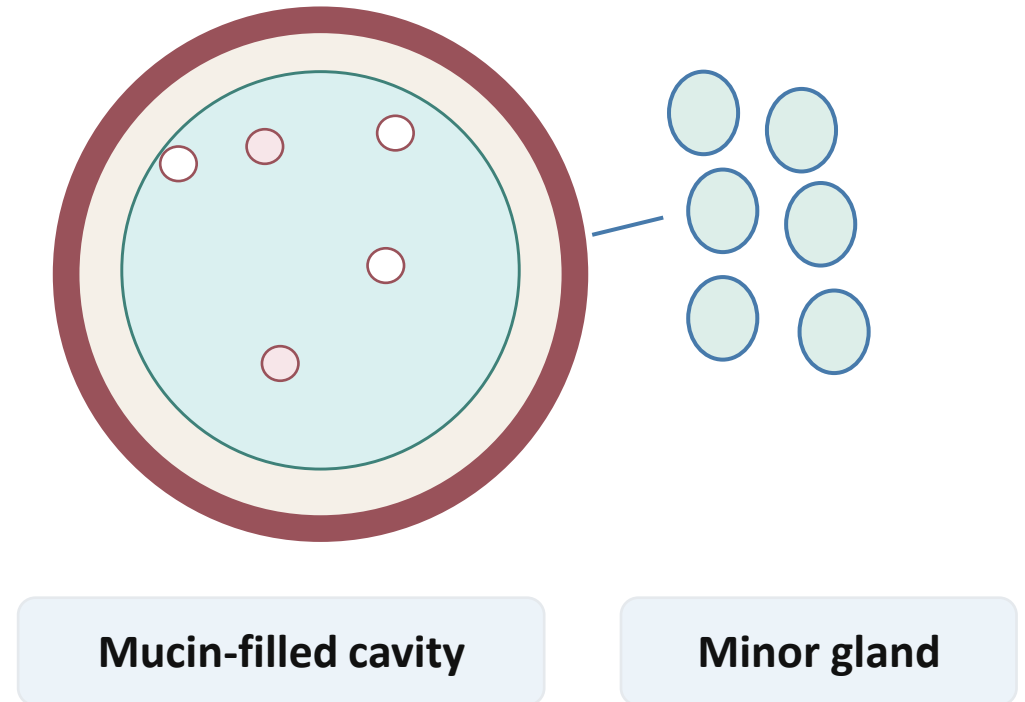
Granulation tissue forms a reactive boundary



The diagnostic wall is reactive tissue rather than a salivary-duct epithelial lining.

Mucin forms the characteristic luminal material

- The cavity contains mucinous secretions.
- Mucin is located outside its normal duct compartment.
- Extravasated material triggers a surrounding tissue response.



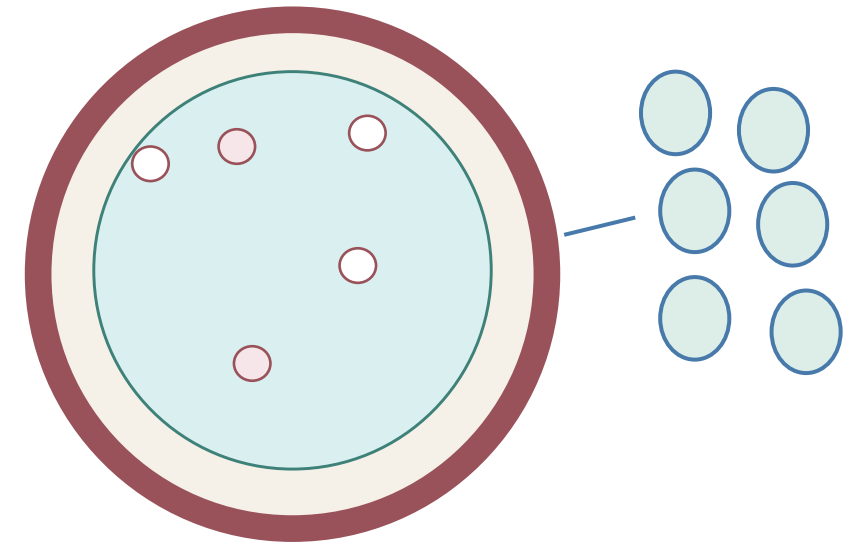
Schematic, not histology

Macrophages participate in mucocele lesions

- Inflammatory cells occur within the mucus-filled cavity.
- Macrophages are highlighted specifically in the Robbins description.
- Their presence reflects the response to extravasated material.

The adjacent gland is a diagnostic clue

- An intact minor salivary-gland lobule may lie beside the cavity.
- The spatial relationship supports a salivary duct origin.
- Robbins' referenced figure includes an adjacent intact gland.



Mucin-filled cavity

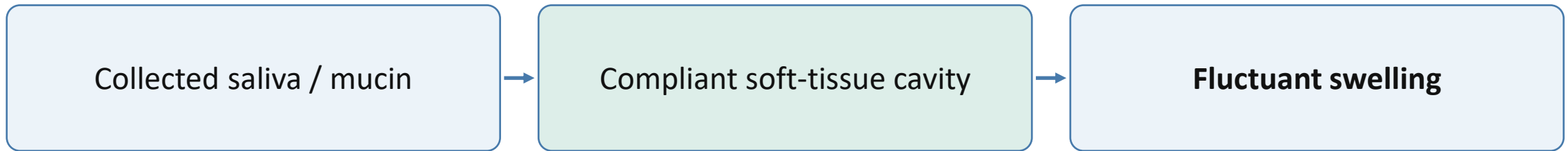
Minor gland

Schematic, not histology

Histologic checklist for an extravasation mucocele

Component	What to recognize
Cavity	Mucinous material
Cavity wall	Granulation / fibrous connective tissue
Inflammatory population	Macrophages and other inflammatory cells
Nearby structure	Minor salivary-gland lobule

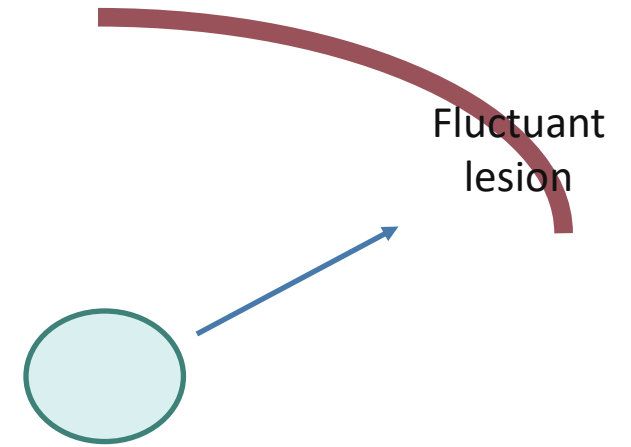
Fluctuance reflects a fluid-filled cavity



The lesion may be described as a cystlike swelling on physical examination.

Blue translucency is a characteristic clue

- The lower-lip lesion often has a blue translucent hue.
- Its appearance is consistent with an underlying fluid-filled collection.
- Color alone is not a substitute for clinicopathologic assessment.



Simplified lower-lip schematic

Mucocele size may fluctuate with meals

- Patients may describe changes in lesion size.
- The history may show a temporal association with eating.
- The variation provides a clue to a lesion connected with salivary flow.

Clinical and microscopic findings are concordant

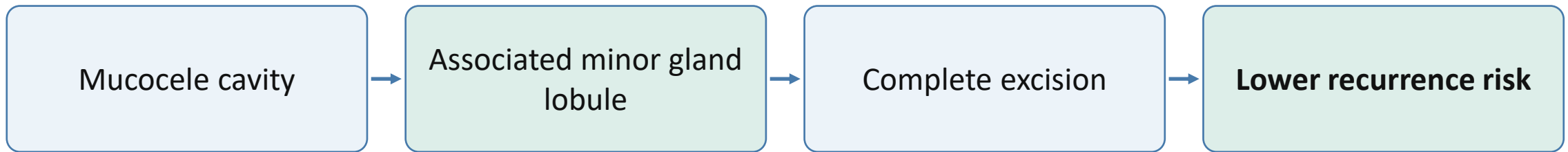
Clinical observation

- Trauma-associated lower-lip swelling
- Fluctuant, often blue-translucent
- Variable size, sometimes around meals

Microscopic correlate

- Mucus-containing cavity
- Reactive connective tissue wall
- Mucin with inflammatory cells / macrophages

Excision must address the source gland



Robbins specifically advises removing the accompanying gland lobule when excising a mucocele.

Incomplete excision permits recurrence

Incomplete removal

- Residual associated lobule may remain
- Ongoing secretion may reform a lesion
- Recurrence is possible

Complete removal

- Cystlike lesion excised
- Accompanying minor gland lobule included
- Addresses the local source of saliva

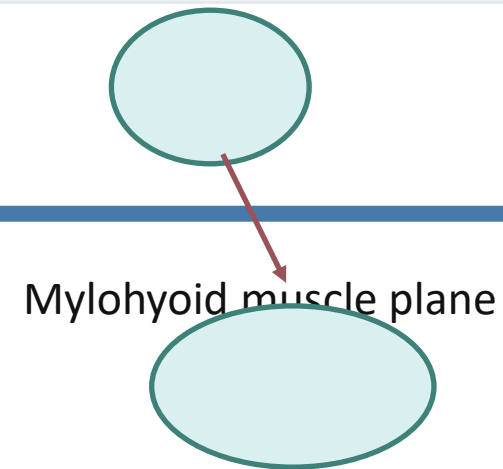
Ranula is a named sublingual-duct lesion

- Robbins reserves the term ranula for an epithelial-lined cyst after damage to a sublingual gland duct.
- The anatomical origin is the sublingual gland and its outflow pathway.
- This wording is source-specific and should not be generalized to every ranula mechanism.

The floor of mouth defines ranula anatomy

- Sublingual glands occupy the floor-of-mouth region.
- A damaged sublingual duct can produce a cystic swelling.
- An expanding lesion may follow connected tissue spaces.

Floor of mouth / sublingual compartment

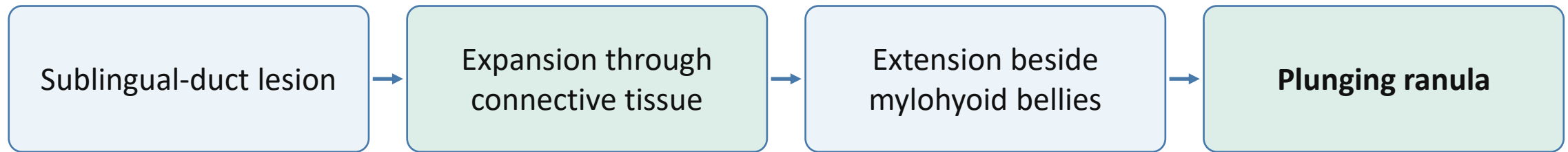


Mylohyoid muscle plane

Extension through connecting tissue

Schematic; Not an anatomical cross-section

Plunging ranula: Extension beyond the mouth

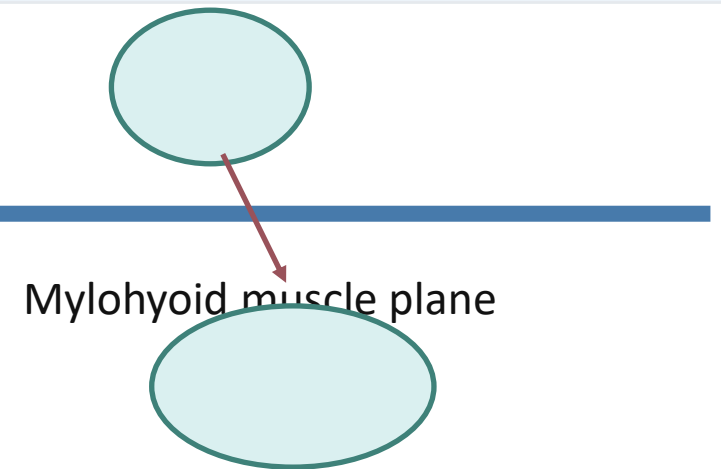


The “plunging” descriptor refers to anatomical extension, not a separate named infection.

Mylohyoid relationships explain the extension

- The mylohyoid forms a muscular plane in the floor of the mouth.
- A cyst dissecting through stroma between its two bellies.
- This allows a ranula to extend beyond its original space.

Floor of mouth / sublingual compartment



Mylohyoid muscle plane

Extension through connecting tissue

Schematic; Not an anatomical cross-section

Mucocele and ranula: Source-level contrast

Feature	Typical mucocele	Ranula
Common origin	Lower-lip minor gland	Sublingual duct
Trigger	Trauma / duct blockage or rupture	Duct damage
Microscopic wall	Pseudocyst; Reactive tissue	Described as epithelial-lined
Characteristic extension	Local stromal mucus pool	May become “plunging”

Do not collapse all salivary lesions together

Process	Main feature	Pathologic logic
Sialadenitis	Gland inflammation	Trauma, infection, autoimmunity
Xerostomia	Low salivary output	Systemic, treatment or medication association
Mucocele	Local mucus-filled lesion	Damaged or obstructed duct
Ranula	Sublingual-related cyst	May extend through floor of mouth

Case 1: Lower-lip swelling

A patient has a fluctuant, blue-translucent nodule of the lower lip after local trauma. Its size changes around mealtimes.

What lesion is suggested, and what microscopic wall is expected?

Case 1: Correlate the two observations

Likely lesion

- Mucocele of a minor gland
- Trauma-associated duct injury
- Salivary extravasation into stroma

Expected morphology

- Mucin-filled pseudocyst
- Granulation / fibrous wall
- Macrophages, without an epithelial lining

Case 2: Dryness with other findings

An older patient reports oral dryness, has an atrophic tongue and dental caries, and takes several prescribed medications.

Which pathophysiologic process best links these findings?

Case 2: Identify reduced saliva secretion

Diagnosis to consider

- Xerostomia from decreased production
- Review medications as a major cause
- Also consider autoimmune and treatment history

Clinical consequences

- Dry mucosa and papillary atrophy
- Increased caries / candidiasis
- Speech or swallowing difficulty

Case 3: Major-gland inflammation

A patient with an acute viral illness has prominent parotid swelling, and the clinical context raises concern for involvement of other glandular organs.

Which source-named infection is the archetype?

Case 3: Identify the glandular distribution

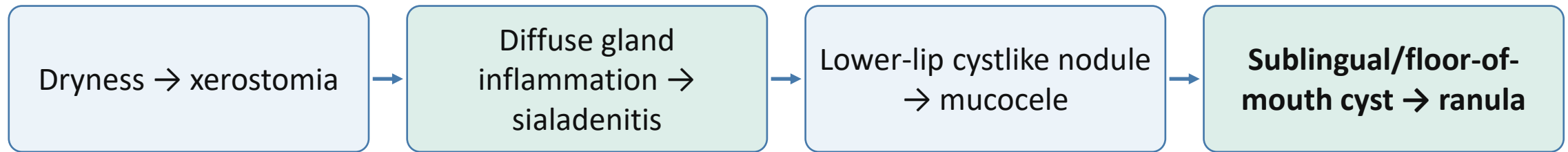
Expected association

- Mumps
- Particularly affects parotid glands
- Other major glands may be involved

Systemic implication

- Pancreatic involvement may occur
- Testicular involvement may occur
- Interpret gland swelling within whole-patient illness

Diagnostic synthesis: Start with the phenotype



This is a teaching classification of dominant phenotypes; It is not a validated clinical diagnostic algorithm.

Four pathology points to retain

- Sialadenitis arises from trauma, infection or autoimmune disease.
- Xerostomia can reflect Sjögren syndrome, radiotherapy or medications and has substantial oral consequences.
- Mucocele is characteristically a lower-lip mucus-containing pseudocyst.
- Ranula originates in the sublingual region and may extend through the mylohyoid connective tissue.

Primary reference and source boundaries

- Robbins, Cotran & Kumar: Pathologic Basis of Disease, 11th edition (2026).
- Chapter 16, Head and Neck; salivary glands and related inflammatory lesions, printed pages 678–679.
- Details of sialolithiasis and suppurative bacterial sialadenitis are reserved for the adjacent independent unit.
- Native diagrams in this lecture are schematics, not actual clinical or histologic specimens.