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內文：

### 【ABSTRACT】

1. 唾液腺結石(sialoliths)臨床和X-ray影像的特色。
2. 一個不尋常的下頷下腺(submandibular gland)產生多顆唾液腺結石案例。
3. 對於在唾液腺內外類似結石的鈣化物做鑑別診斷。

### 【INTRODUCTION】

1. 定義：Salivary gland/ duct stones or sialoliths are calcifications that accumulate within the salivary gland parenchyma and associated ductal systems.
2. 組成：They develop from a mineralization nucleus of debris including
  - (1) **bacterial colonies** (2) **shed ductal epithelial cells and cell remnants**
  - (3) **mucus plugs** (4) **foreign bodies**
3. 發生率：submandibular (80~90%)> parotid (10~20%) > sublingual (1%)  
Multiple stones → 32% of parotid, 22% of submandibular  
Bilateral → 2.2%

4. 臨床表徵：The most frequent clinical presentation is **swelling and pain** in the area of the affected gland with a prodromal awareness varying from less than six months to 30 years. Sialoliths can often be detected on palpation, especially when they are located above the mylohyoid muscle or in the buccal mucosa and lip

Sialoliths in the **submandibular** gland duct are usually diagnosed after **longer asymptomatic periods** than those in the parotid gland duct. This is **due to greater ductal volume** between the hilus and submandibular papilla and the ability to accommodate the obstruction while still allowing saliva to flow past the obstruction.

**Complete obstruction** however, presents as an emergency situation with severe symptoms including a tense swollen gland with **marked sensitivity, ductal swelling** and on **occasion suppuration**

This may be accompanied by **localized cellulitis, malaise and fever**

Table 1. Signs and symptoms

- (1) **Swelling** (2) **Anatomical asymmetry** (3) **Residual glandular swelling**
- (4) **Size fluctuation**, usually rapid onset and partial resolution over several hours
- (5) **Decreased stimulated salivary flow** compared to the contralateral gland
- (6) **Pain** (intensifies during mealtimes or when salivary flow is stimulated)
- (7) Stones commonly visible in submandibular duct
- (8) Swelling and erythema of submandibular papilla for distal stones
- (9) Suppuration (uncommon)
- (10) Localized cellulitis (uncommon)

5. 結石尺寸：Salivary calculi **larger than 1 cm are rare**  
(by Lustmann) 79.8% of 302 sialoliths < 1 cm, only 7.6% > 1.5cm

### 【CASE REPORT】

<General data> 57-yrs-old female

<C.C > **pain and swelling** over left submandibular triangle with a duration of around three months. Intra-orally she was aware of a **firm mass in the floor of the mouth**.

< History > unremarkable and no previous similar episodes involving either site.

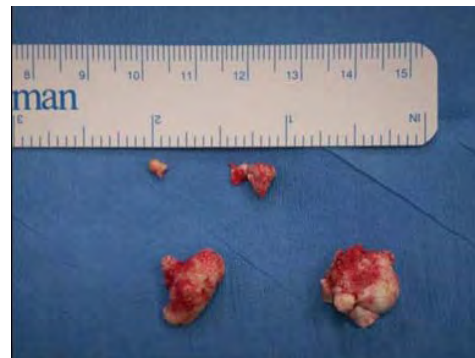
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- (1) A visible **swelling of the left submandibular triangle**
- (2) Localized to a **tense and sensitive** submandibular salivary gland
- (3) Overlying skin erythema (-), temperature differential(-), lymphadenopathy (-)
- (4) **Multi-nodular enlargement** (two presumed calcifications palpable) of the submandibular duct, **fixed** and did not move antero-posteriorly
- (5) Stimulated saliva flow discharge (-), suppuration (-) of the submandibular papilla
- (6) Panoramic radiograph showed an elongated **RO structure superimposed over the roots of the 31 to 37 and with obscuration of the root anatomy**
- (7) Occlusal radiograph revealed **at least three sialoliths** occupying most of the length of the left submandibular duct **extending from the distal extent proximally to the molar area and lingual fossa. Lamination** can be seen within the sialolith



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- (1) The calculi were **surgically exposed and individually dissected** free due to **extensive fibrosis** and adhesion to the wall of the duct.
- (2) Following removal of all stones, the duct was **cannulated and expanded and became patent** with transmission of normal secretory elements.
- (3) **Proximal repositioning** of the duct orifice to the mid-left floor with a circular suture back technique **to prevent subsequent fibrosis and duct stricture**.
- (4) **Four calculi** were identified at operation and removed dimension. They were **irregular to oval** in shape with **rough, multi-nodular** and **irregular surfaces**. There was also evidence of fibrotic tissue covering the calculi.



1. The presence of submandibular sialoliths can **cause salivary gland dysfunction**

- and obstruction of salivary flow** resulting in **chronic or acute bacterial infections**
2. Varying degrees of **atrophy** of the glandular parenchyma with **ductal expansion and fibrosis** of the interstitium may also occur
  3. Stones present for an extended period and particularly those with an **irregular external surface** may provoke a **focal inflammatory reaction** within the duct wall with **resultant scarring and enhanced obstruction**.
  4. Contributing factors to the incidence of sialoliths in submandibular gland.
    - (1) **More viscous mucus content** of the saliva
    - (2) The **high concentration of calcium phosphate**
      - This creates a more alkaline pH which not only **favors the solid-liquid phase** exchange of calcium phosphate species but causes **precipitation of the more reactive species dibasic calcium phosphate**.
  5. The above is helped by the **ascending course** and **narrow orifice** of Wharton's duct compared to the calibre of the duct itself, encouraging stagnation of saliva.
  6. Radiographic examination of sialoliths :
    - (1) *Intra-oral radiographs*
      - 94.% (by Lustmann)
    - (2) *Plain radiographs*
      - Small or partially mineralized calculi may undetect. About 20 % (by Blatt)
    - (3) *Mandibular oblique lateral radiograph*
      - displaying the floor of the mouth **without overlap from other anatomy**
  7. Other imaging techniques :
    - (1) *Sialography*
      - Should be restricted to those cases with a **suspected ductal stricture** or other obstruction but **without a calcification visible on routine imaging**
    - (2) *Ultrasound*
      - Can locate a sialolith but it is of limited clinical usefulness. Until proven otherwise it is prudent **to consider and exclude the presence of multiple sialoliths** in any patient presenting with a sialolith
    - (3) *CT*
      - **Useful in where there are multiple stones** or **when the stone is situated in a site not readily examined intraorally**, for example, the lingual fossa and proximally including intraglandular stones and similarly for the parotid gland

Table 2. Radiographic features

- (1) Radiopaque (homogeneous or with a laminated structure)
- (2) Some may be RL
- (3) Cylindric or irregularly-shaped
- (4) Anatomical position important
- (5) **Imaging must include full duct length and gland**
- (6) **Stone orientated antero-posteriorly within duct**
- (7) Fixed stones tend to be more rounded

## 8. Treatment

- (1) In most cases **treatment is advised either for management of symptoms**
- (2) In quiescent lesions, to **prevent periductal inflammation and fibrosis and the development of an obstructive situation**
- (3) When the stone is small, conservative management such as **moist heat, increased intake of fluids**, sialagogues and **gentle massage** of the gland towards the gland duct opening may be all that is required to allow spontaneous release of the stone. A small sialolith near the orifice of the duct may also be removed following widening of the orifice with a **lacrimal probe**

- (4) Sialoliths in the gland duct can often be removed without damage to the gland but **intraglandular sialoliths generally require removal of the gland.**
- (5) Stone removal **in the posterior part** of the duct or removal of the gland may lead to complications such as **damage to the lingual and hypoglossal nerves** or **bleeding into the floor of the mouth**
- (6) This procedure is usually performed **under general anaesthesia** to better control any bleeding and to dissect and protect the lingual and hypoglossal nerves
- (7) Other treatments used successfully in the management of sialoliths include **sialendoscopy** with wire-basket extraction for small sialoliths (< 4 mm) and fiberoptic laser **lithotripsy** with basket retrieval for larger sialoliths (> 4 mm)

**9. Differential diagnosis**

Table 3. Differential diagnosis

**Mandibular torus**

→ Constant relationship with the mandible on films with different angulations

**Osteoma**

→ pain is usually not a symptom.

**Calcified lymph nodes**

→ Usually **both RO and RL** with mottled and irregular borders

Differential diagnosis of a calcified mass in the submandibular area would favor a sialolith due to its relative **higher incidence.**

**Phleboliths and other vascular calcifications**

→ Tend to have a **dense ring** with a radiolucent centre giving a **bull’s eye or target appearance** on an occlusal radiograph

**Calcified atherosclerotic plaques in major blood vessels**

→ Calcification in a **short section of the facial artery** near the submandibular area could simulate a sialolith. A calcification in the common carotid usually lies next to the C3–C4 and **more laterally** on a panoramic view than a sialolith

**Myositis ossificans**

→ Most common in the masseter, other muscles of mastication such as the temporalis, medial and lateral pterygoid can also be involved. Myositis ossificans in the **medial pterygoid** can mimic a submandibular sialolith. **Trismus** should alert the clinician to the possibility of myositis ossificans

**Metastasis from distinct calcifying neoplasms**

**Tuberculosis of lymph nodes or of the salivary gland itself**

**【CONCLUSION】**

- 1. submandibular and facial **pain** particularly **when related to mealtimes**
- 2. **careful history taking** and the selection of the **correct imaging techniques**

題號	Which one of the following patient has the highest possibility suffering sialoliths ?
1	(A) 11-yr-old male, swelling over mouth floor, severely pain (B) 52-yr-old female, swelling over pre-auricular area, no pain (C) 43-yr-old male, swelling over lower premolar lingual gingival, pain (D) 26-yrs-old female, swelling over upper premolar buccal mucosa, pain
答案( )	出處：Oral & Maxillofacial Pathology ~2 <sup>nd</sup> edition
題號	Which one of the following method may not be recommended for removal of the small sialoliths ?
2	(A) moist heat

	(B) sialendoscopy (C) increased intake of fluids (D) lithotripsy (E) gentle massage
答案()	出處：Oral & Maxillofacial Pathology ~2 <sup>nd</sup> edition