**CASE REPORT**

Submandibular sialolith – a case report

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**Abstract**

Sialolith is relatively common (80%) in the submandibular salivary gland due to the viscous nature of its mucinous secretions, high calcium content, and its tortuous ducts. In the present case, the patient presented with a history of swelling below the tongue for the past 12 years. The diagnosis of submandibular sialolith was made through clinical examination and intraoral occlusal radiograph. The present manuscript briefs on the treatment protocol employed in the present case and summarize the various therapeutic modalities available for sialolith.

**Keywords:**

Calculi, submandibular gland, sialolith

**Introduction**

The most common salivary gland condition encountered in the oral and maxillofacial region is the salivary calculi also termed as the salivary stone. Medically, these stones or calculi are referred to as a sialolith. 12 out of 1000 adult population is affected by the condition yearly. The condition has a strong male predilection.\(^1\) The incidence of occurrence of sialoliths in the parotid region is around 5–20%, the sub-lingual and other minor salivary glands range from 0% to 10% and that for the sub-mandibular region is around 80–90%. The high recurrence rate of sialolith in the submandibular region is due to its glandular secretions being drained against the gravity while the flow of other glands is along the gravity. Both the right and left sides are affected; however, bilaterally arising stones are infrequent.\(^2\)

Nearly 88% of sialoliths are reported to be <10 mm in dimensions. According to the review of literature, the development of atypically large (>15 mm) salivary sialolith was found to be very sporadic.\(^3\) Most cases of sialolith occur between the 3\(^{rd}\) and 6\(^{th}\) decades of life. Sialolithiasis is relatively rare in the pediatric population. Classical manifestations of salivary lithiasis include pain and swelling, especially during a period wherein the salivary flow is stimulated as during the pre-meal period. The sialolith obstructs the salivary ducts hindering the normal flow of salivary secretions, thus aggravating the symptoms. Reports of giant salivary calculi being asymptomatic for many months before presentation have been reported in literature.\(^4\) The present manuscript reports a case of submandibular sialolith and briefs on the clinical examination, radiological investigation, and the surgical excision.

**Case Report**

A 53-year-old male reported to the Department of Oral and Maxillofacial Surgery at Dr. D.Y. Patil Dental College and Hospital, Pimpri, Pune with a chief complaint of swelling below the right side of the tongue since 12 years [Figure 1a]. The swelling was peanut size at the beginning which increased over the period and attained the present size. The swelling was hard in consistency and non-tender on palpation. No signs of decreased salivation were noted. On examination, the swelling was seen extending from the lingual aspect of 42 extending posteriorly up to the lingual sulcus of 47. On palpation, the swelling was ovoid to round in anterior lingual sulcus and conical or slender as it extended posteriorly. An occlusal radiographic investigation was carried out and it revealed a well-demarcated radiopacity with a conical appearance suggesting of a salivary stone or calculi in the floor of the mouth [Figure 1b]. The sialolith was planned to be excised under local anesthesia. Routine minor surgery protocol was followed and 2% lignocaine hydrochloride with adrenaline 1:200,000 was infiltrated in the floor of the mouth around the pathology. A 1 cm incision was placed on the most
dependent part of the calculi while taking care of vital structures, and blunt dissection was carried out further to explore the submandibular duct and access the calculi [Figure 2a-e]. The submandibular salivary calculus was identified and using digital pressure the calculi was pushed anteriorly and retrieved. The calculi measured approximately 3 cm × 2.2 cm [Figure 3 a, b].

Using tissue forceps, the Wharton’s duct was examined and showed active mucous secretions from the gland. Milking of the gland was done to stimulate saliva secretions. Hemostasis was achieved by applying digital pressure. Three interrupted stay sutures were given using 3-0 Mersilk. Post-operative antibiotics and analgesics were prescribed for 3 days, and the patient was routinely followed up for 6 months. The surgical site healed without any complications. No signs of recurrence were noted.

**Discussion**

Several theories have been proposed for salivary gland stone formation including an inflammatory, infective, mechanical, neurogenic, and chemical origin. Stone formation occurs when amorphous tricalcium phosphate precipitates around an organic matrix of mucin arising from the major gland, desquamated epithelial cells as well as bacteria. Crystallization takes place right after, and the structure that is formed gives rise to the initial hydroxyapatite focus. This focus acts as a scaffold onto which further deposition is added expanding the size of the sialolith. Giant salivary calculi are believed to develop in salivary ducts, which allow expansion as well as allows the salivary flow around the calculi. The calculi gradually increase in diameter, with no symptoms of illness or diseases being reported by the patient for a considerable period as seen in the current case. Large salivary calculi are either oval or elongated in shape. Texture wise they are hard, yellow in color with a porous aspect. The calculi in our case followed the same typical appearance developing within the submandibular gland hilum and duct.

The factors which make the submandibular gland vulnerable to stone disease are the length and caliber of the duct and direction of flow of the salivary content. The Wharton’s duct is longer and has a larger caliber than parotid gland duct (Stensen’s duct), and since its secretion flow against the gravity, it favors the development of large salivary gland stone. This results in a decrease in the rate of salivary flow. Furthermore, the pH of saliva of the submandibular gland is of a higher alkaline nature as compared to that of the parotid glands, having an increased concentration of calcium as well as mucin. The tendency for formation of sialoliths, and potential to support its expansion, is responsible for the high incidence of these giant sialoliths in the submandibular gland. The detection of giant salivary lithiasis is often based on clinical history, a thorough clinical examination, and radiographic evidence. Investigations such as plain radiography discern the opaque stones in most cases (80–95% of sialoliths). Intraoral occlusal radiographs have also proven to be exceptionally useful as in the present case. Computerized tomography scanning is the most accurate non-invasive diagnostic tool for establishing the position of stones.

Sialoliths of different sizes and also glandular damage from chronic obstruction can be visualized through another radiographic examination called as a sialography. Ultrasound is yet another non-invasive method of identifying sialoliths. To be identifiable on ultrasounds with an accuracy of 99%, the size of the stones should be bigger than 1.5 mm, and its mineral content should be high. Ultrasound imaging helps in planning the treatment by

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**Figure 1:** Pre-operative photographs of the sialolith – (a) Intraoral clinical view; (b) intraoral occlusal radiograph

**Figure 2:** Intraoperative photographs – Order of sequence from a to e

**Figure 3:** The excised sialolith – (a) Length; (b) width
detection of even the smallest calculi. It has been described as an efficient method of denoting salivary flow after the removal of the sialolith.\(^\text{[9]}\) While planning for the intervention of such sialolith, it is important to assess the position and size of the sialolith. The aim of the treatment for giant sialoliths, as it is for normal size sialolith, is mending the normal flow of salivary secretion. Chronic sialadenitis which is secondary to obstruction from a huge sialolith gives rise to a fibrotic and deficiently operating gland. However, symptoms clear up after the removal of the sialolith.\(^\text{[9]}\) Sialodochotomy is a procedure done intraorally for the elimination of ductal sialolith, including the giant sialoliths. Potential issues comprise stenosis of the duct and damage to the lingual nerve. Sialendoscopy is an accepted intervention, for the elimination of giant salivary sialolith.\(^\text{[10]}\) Submandibular gland excision is advocated in substantial intra-glandular sialolith, which cannot be approached through a transoral approach. When numerous small sialolith is present in Wharton’s duct, sialadenectomy is recommended.\(^\text{[10]}\) The risks of mandibular nerve palsy while excision of the gland are around 8%. There was no injury to the nerve in the reported case. Giant sialoliths are not uncommon. Most of the cases present with the classical picture of salivary colic. Modern methods of sialolith interventions have been described for the management of giant sialolith, but transoral sialolitohotmy with sialodochoplasty or sialoadenectomy still continue to be the cornerstone of treatment.

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