

# Sialolithiasis—A Literature Review

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## Introduction

Sialolithiasis, also called salivary stones or calculi, is considered to be the most common salivary gland disorder and accounts for more than 50% of the diseases of major salivary glands [1]. It is a condition where salivary gland or its excretory duct obstruct due to the formation of calcareous concretions, resulting in salivary ectasia and subsequent dilatation of the salivary gland [2]. Sialoliths occur in submandibular gland or its duct more than 80% to 90 %, 6% in the parotid gland and 2% in the sublingual gland or minor salivary glands. Multiple calculi in submandibular glands are rare [3]. Although the exact cause of Sialolithiasis is unknown, it may be due to deposition of calcium salts around central nidus [2].

Sialolithiasis affects 12 in 1000 of the adult population. It can occur at almost any age, but commonly occurs from 3<sup>rd</sup> to 5<sup>th</sup> decade of life or 30 to 60 years of age group. In children it is rare but some studies showed 3% of all sialolithiasis cases in pediatric population. Males are slightly more affected than female (4:3). Submandibular gland is more prone to the formation of salivary calculi because of its longer and tortuous Wharton's duct, mucinous saliva, small orifice, salivary flow against gravity, more alkaline salivary pH and greater amount of calcium, phosphates and mucin proteins than that of serous parotid saliva [2].

Sialolith clinically appears as rough or smooth in texture, round, cylindrical or oval in shape. Although they may be white or yellow-brown in color, they are typical yellow [4].

Sialolithiasis of more than one salivary gland are rare. Due to mechanical obstruction of salivary duct the patient experience repetitive pain and swelling just before, during and after meals, dryness of mouth not occurred as salivary stones are usually unilateral [5]. Swelling may remain temporary or worsened by bacterial infections. Sometimes swelling is diffuse and simulates a cellulitis [6]. Secondary infection often cause fever and redness. Secretion of the

## Abstract

Sialolithiasis is the most common disease of salivary glands and therefore causing acute and chronic infections. Major salivary gland is most commonly affected. Sialolithiasis is the main cause of unilateral diffuse swelling of parotid or submandibular gland. Submandibular gland or its duct affects most commonly. This article discusses review of literature, pathophysiology, signs and symptoms, diagnostic methods and various modalities available for the management of sialolithiasis.

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gland is hampered when stone reaches a size causing obstruction of the duct, leading to destruction of the gland [2]. The estimated growth rate of sialolith is 1mm per year [7].

## Pathophysiology

The exact pathophysiology of stone formation is unclear. The presence of calculi cause chronic sialadenitis. Conversely, intraglandular and intraductal concretions caused by chronic sialadenitis can promote stone formation [8].

## Various diagnostic approach:

- 1) Standard X-Ray Films
- 2) Computed Tomography Scan
- 3) Ultrasonography
- 4) Xeroradiography
- 5) Sialography: old "Gold Standard"
- 6) MR Sialography: new noninvasive technique
- 7) Sialendoscopy

20% of submandibular and 40% of parotid stones are not radiopaque and thus xeroradiography and sialography aid to locate them [5][9]. In Sialendoscopy microendoscopes are introduced into the duct systems and provide direct visualization and evaluation of the intraductal and intraglandular microanatomy [10].

## Treatment and Prognosis

There are various modalities of treatment employed based on size, number and location of the sialolith, symptoms associated with it or whether it is present in the duct or the gland. The floor of the mouth, along Wharton's duct on a posterior to anterior direction is palpated bimanually [11]. Sialogogues promote saliva production and flush the stone out of the duct. If swelling is present a penicillinase resistant anti-staphylococcal antibiotic with simple sialolithotomy is helpful [5][12][13].

Sialoliths which are present near the orifice of the duct or sufficiently forward can be removed by milking or manipulation of the gland. With the aid of lacrimal probes and dilators open the duct. Once the duct is open, the stone can be identified, milked forward, grasped and removed [14].

Mostly submandibular calculi lie in the distal third of the duct and are simple to remove surgically through an transoral approach where an incision is made directly onto the stone in the floor of the mouth. This is relatively simple to perform and not usually associated with any complications [15]. If stones are present more posteriorly or 1-2 cm from punctum, it can be

grasped and removed by cutting in longitudinal axis of the duct directly onto the stone. Closure is not done, duct is left open for drainage. Care should be taken for lingual nerve as it lies in the close association with submandibular duct posteriorly. The management of parotid duct is more complicated as only a small segment of duct is approachable and opening can cause stenosis of the duct. Therefore require gland removal for majority of the cases [5].

The patients who do not respond to conservative therapy or if the gland has been damaged by fibrosis and recurrent infection, may require surgical removal. Also, multiple sialoliths below the posterior edge of mylohyoid muscle, or in the duct, or at the hilum of the gland or within the gland, require surgical removal under general anaesthesia through an extraoral approach [10].

Alternative methods of treatment that avoid the use of surgery are Extracorporeal Shortwave (ESW) lithotripsy [16][17] and Intracorporeal Endoscopic lithotripsy, or sialoendoscopy or sialendoscopy [10]. ESW is a non-invasive method which causes fragmentation of the sialoliths. In this shockwaves are applied from externally through lithotripter [17]. The average size of fragments produced is about 0.7 mm through Extracorporeal Shortwave lithotripsy. A retrospective study revealed a success rate of 83% with no severe complications of patients treated endoscopically [18].

## Conclusion

Sialolithiasis is not an uncommon disorder of salivary duct or gland. Salivary stone diagnosis is mainly based on clinical symptoms and imaging. Management is done after managing any inflammation or infection by surgical means. At present, although surgical treatment is the main treatment modality, newer minimally invasive techniques with low morbidity like shock wave lithotripsy and salivary gland endoscopy shown to be effective in treatment of sialolithiasis of major glands.

The cases of parotid gland sialolithiasis, which are resistant to minimally invasive techniques, gland removal should be carried out. If the size of an intraglandular stone reaches 12 mm or more or on failure of lithotripsy, submandibular gland removal may be indicated, as the success of lithotripsy may be less than 20% in such cases.

## References

References are Available on Request at editor@healalkht.com.