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Clinical case: Removal of a giant sialolith using the transoral approach

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Abstract

Salivary gland diseases are often linked to sialolithiasis with mainly involving the submandibular gland and ducts. Sialolithiasis can vary in different sizes, shapes and any measurements exceeding 15mm are considered as giant sialoliths. Swelling to the salivary glands is closely linked to sialolithiasis and is still considered as an infrequent diagnosis. The clinical case involves a 55-year-old male patient with evident swelling to the left submandibular area of the mouth. The correct diagnosis was identified and with the use of a computed tomography (CT Scan) confirmed the presence of a giant sialolith. It is imperative to examine the oral area to identify any tenderness or concerning enlargements and therefore a palpable intraoral was carried on the sialolith.

Keywords: Sialolithiasis, submandibular salivary gland, sialolith, transoral sialolithotomy, local anesthesia, primary care, intraoral, extraoral, palpable

Introduction

Sialolithiasis or in other term salivary gland stone is defined as a calcified or hard mass formed within a salivary gland. Submandibular salivary gland is most likely to be involved in comparison to the parotid and sublingual salivary glands [1]. Salivary calculi are unilateral in most of the cases while bilateral involvement of sialolithiasis is very rare [2].

Sialolithiasis affects 12 in 1000 adult population and middle age groups are most commonly involved, Male > Female [3-5]. While the exact etiological factors remain unknown, saliva is thought to play a role in formation of the salivary stones.

The alkaline nature of saliva, high calcium and phosphate concentrations of the saliva within the submandibular gland results in the formation of salivary stones [6, 17]. Sialolithiasis varies in sizes and shapes and are usually ranging from 1 to 10 mm. The size of sialoliths with 15mm and more are categorized as Giant sialoliths [7].

The management of the sialolithiasis depends upon the location and size of the sialolith. Small stones are removed from the duct via gland massage and sialogogues are used to stimulate the salivary flow. The large stones are excised via invasive management and these includes shock-wave lithotripsy, sialoendoscopy or surgical removal of the stone [8-9].

Case presentation

A 55-year-old male patient was referred to the clinic with a complaint of experiencing a discomfort swelling in left lower posterior jaw. The swelling was persisting approximately around 7-8 years and as mentioned previously the swelling was present to the left submandibular salivary gland. The swelling was asymptomatic with slight focal asymmetry on the left side of the face, this was a key indicator that there was some form of pathology present as the cheek area was considerably noticeable in size compared to the right side of the face. During the consultations there was no history of pain, infection or xerostomia associated with the swelling, it's very important to have a clear understanding of the history and therefore we reviewed the history of symptoms in depth. Due to the swelling being present the patient had a concern of the swelling and went on several occasions to seek medical intervention prior coming to our practice. We carried out an oral examination and on palpation hard mass was observed with respect to the left lower posterior region.

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We diagnosed it as a salivary gland calculus and to confirm our diagnosis a cone beam computed tomography was performed (CT, an advanced type of x-ray) mostly used when the regular dental x-rays are not adequate. The results revealed that a sialolith measuring approximately 28mm x 17mm was present within the left submandibular gland. Further discussions on how to handle this case were being reviewed in depth and part of the review both intraoral (inside the mouth) and extraoral (outside the mouth) treatment for the removal of sialolith were taken into consideration.

Case summary

Computed tomography revealed a calcified mass of approximately 28mm x 17mm within the left submandibular gland. The images of the computed tomography (attached

below) shows a giant sialolith. In this case, the sialolith was removed with conservative approach intraorally and the sutures were placed.

As part of the treatment consultations we continued with thorough discussions with the patient and as we value primary care for our patient we included him in all of the process so that he was in full control of his treatment plan. Prior to discussing our treatment plan we had to make sure that there was no medical and family history that we had not covered previously. After some detailed investigations and discussions with the patient, it was agreed to remove the sialolith using a conservative intraoral approach. This method involved continuous digital pressure, an extraoral gland massage and a transoral Sialolithotomy was performed under Local Anesthesia.

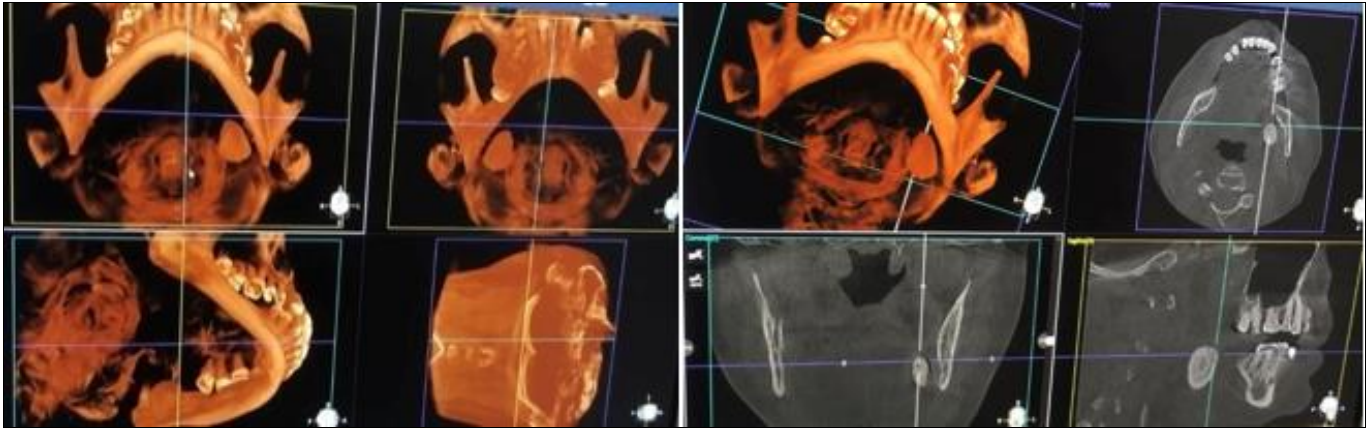


Fig 1 and 2: Computed Tomography scans showing a calcified mass measuring 28 mm x 17 mm

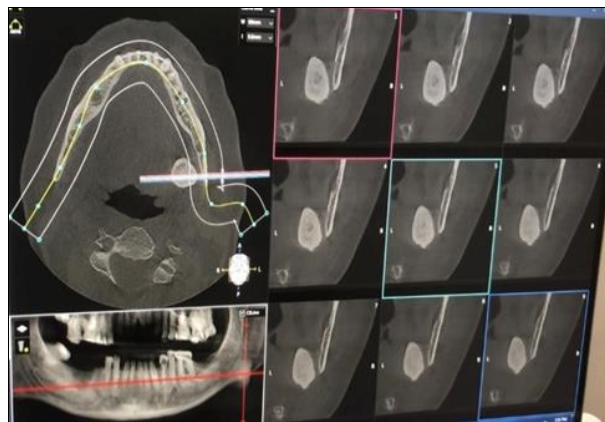


Fig 3: Pre-operative CT view



Fig 4: Post-operative intraoral view

It was noted that for full recovery the following would be most beneficial for recovery

- Avoid eating hard foods.
- Soft foods would be the better choice.
- No smoking.
- No alcohol.
- Rinse with warm salt water throughout the day and after meals.

The post-surgical examination revealed full recovery with no complications or concerns for the patient

Discussion

Sialolithiasis is referred to as a calcified mass formed within the ducts of the salivary gland caused due to the obstruction of salivary flow. Certain factors involving stagnant salivary flow, viscosity of the saliva, deposition of mineral salts, higher calcium and phosphate levels of the saliva secreted by the submandibular gland can lead to the formation of salivary stones. [3, 9, 16, 17]. While the exact etiology remains unknown, there are certain factors which are responsible for the formation of stones. These factors include infection, salivary stasis, deposition of organic and nonorganic substances/bacteria, salivary mucin etc. [4, 17, 18].

Submandibular gland is most commonly involved than parotid gland and sublingual gland because of the long, tortuous course of the Wharton's duct. The saliva secreted by the submandibular gland is thick and viscous and it also has higher levels of calcium and mucin. [10, 18].

Sialolithiasis mainly affects the submandibular gland with the involvement of 80-90% cases followed by the parotid gland (5-10%) and 1-3% involves sublingual glands. It usually occurs on one side while 2-3% cases occur on bilateral sides

of the gland, which is rare [4, 11]. A survey was conducted by J. Lustmann *et al.* and it was found that in 231 patients' submandibular gland was involved while the involvement of parotid gland and sublingual gland in patients were 11 and only 1 cases respectively among 245 patients [12].

Salivary calculi are common among middle aged men, most of the cases present with symptoms of pain and swelling in the affected gland due to the obstruction of the salivary flow [13, 14]. During radiographic interpretation, sialoliths appears as radiopaque. The shape of the sialolith varies from round, oval or cylindrical during overall inspection with a yellow or yellow-brown color [13].

Submandibular Stones have a smooth surface whereas Parotid stones have an irregular surface. Systemic causes include Diuretics usage which leads to the formation of salivary stones due to the decreased salivary flow rate. Other causes may include smoking that cause inflammation of the salivary gland/ duct as it decreases antimicrobial activity of the saliva [14].

Sialography was used for the diagnosis of sialolithiasis due to excellent visualization of the salivary ducts. Non-contrast computed tomography is used for sialolith evaluation. Contrast enhanced CT offers better evaluation of the ductal system [15]. Computed Tomography and Cone Beam Computed Tomography are useful in detecting any size of sialolith but the radiation dose is quite high [14]. Direct visualization of salivary stones and the ductal system is possible via sialendoscopy [15]. Among Treatment modalities, Non-invasive management includes massage of gland along with sialogogues and irrigation for small stones, Intraductal stones are removed via an intraoral approach under local Anesthesia. Invasive treatment involves lithotripsy, Sialoendoscopy or surgical removal [14].

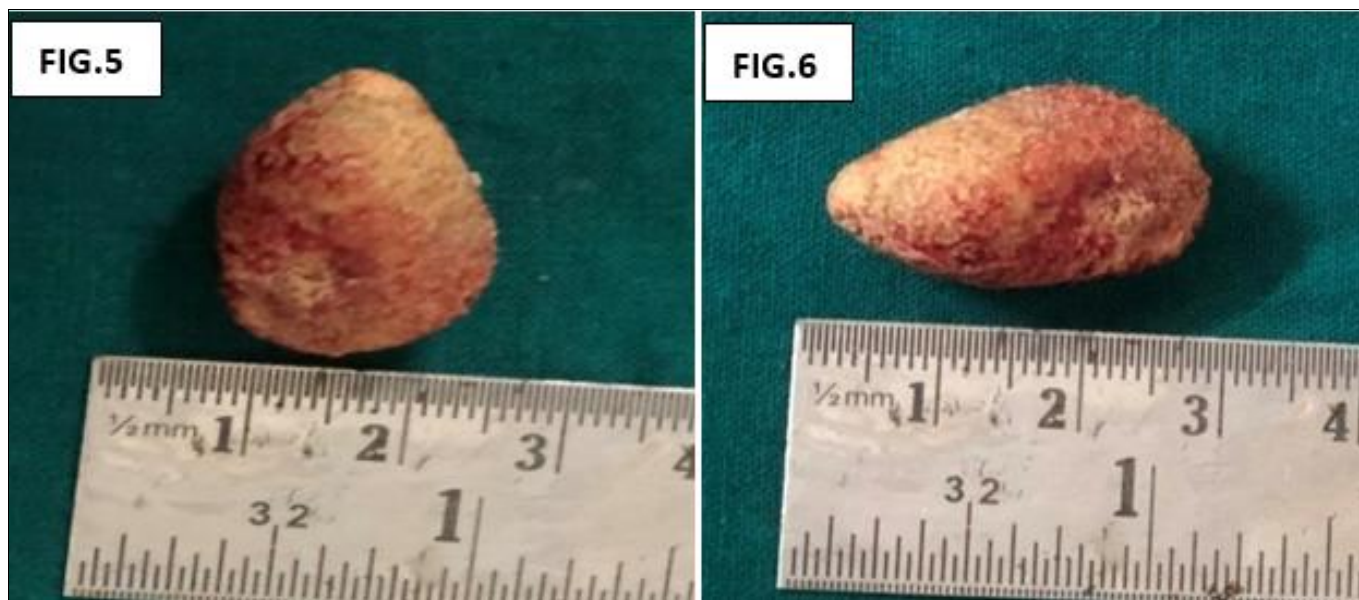


Fig 5 and 6: Giant Sialolith measuring 28 mm x 17 mm

Table 1: Representing the various cases of giant sialolithiasis and the consulted treatments

S. No.	Authors	Reference article	Age/sex	Salivary Gland	Findings	Size of sialolith	Imaging	Consulted Treatments
1.	M.A. Almasri	Management of giant intraglandular submandibular sialolith with neck fistula. Annal Dent Univ Malaya 2005; 12: 41-45. Management of giant intraglandular submandibular sialolith with neck fistula. Annal Dent Univ Malaya 2005; 12: 41-45. Management of giant intraglandular submandibular sialolith with neck fistula. Annal Dent Univ Malaya 2005; 12: 41-45. Management of giant intraglandular submandibular sialolith with neck fistula. Annal Dent Univ Malaya 2005; 12: 41-45. Management of Giant Intraglandular Submandibular Sialolith with Neck fistula Annal Dent Univ Malaya 2005;12:41-45	70/M	Left submandibular gland	Chronic Pus discharging extraoral fistula	23x17 mm	OPG CT	Excision of the Submandibular gland and stone under General Anesthesia
2.	Royce J Biddle, Sandeep Arora	Giant Sialolith of the Submandibular Salivary Gland PMID: 27303513 PMCID: PMC4896171 DOI: 10.2484/rcr.2007.v3i2.101	48/M	Right Submandibular Gland	Persistent Draining Wound	2.6x2.1x1.5cm	CT of Head and Neck	Excision of Gland
3.	Lokesh Babu KT, Manoj Kumar Jain	Giant Submandibular Sialolith: A Case Report and Review of Literature 10.5005/jp-journals-10001-1074	50/M	Left Submandibular Gland	No History of pain or swelling aggravating during meals	62x20 mm Weight-40gms	Mandibular Occlusal radiograph	Transoral Sialolithotomy & Sialodochoplasty under Local Anesthesia
4.	Taiana Campos Leite, Vania Blei, Danielle Pereira de Oliveira, Tatiana Ferreira Robaina, Maria Elisa Rangel Janini, and Valdir Meirelles Jr	Giant Asymptomatic Sialolithiasis Int J Oral-Med Sci 10(3):175-178, 2011	54/F	Right Submandibular Gland	No signs of inflammation or infection	35x7mm	Occlusal Radiography of Mandible	Surgical Excision of Sialolith under Local Anesthesia
5.	Sachin Dalal, Saurabh Jain, Sagar Agarwal Neha Vyas	Surgical management of an unusually large sialolith of the Wharton's duct: A case report Volume 4, Issue 1, January 2013, Pages 33-35 https://DOI.org/10.1016/j.ksujds.2012.11.006	40/F	Left Submandibular Gland	Swelling, Pain & Pus discharge from left side floor of the mouth	18x6 mm Weight 0.59gms	Occlusal Radiograph	Sialolithotomy via intraoral approach
6.	Kayalvizhi EB, John Baliah Vishwanath Rangdhol Lakshman VL	Giant Sialolithiasis - A Case Report and Review Journal of Scientific Dentistry 2014;4(2):30-33 DOI: 10.5005/jds-4-2-30	36/M	Right Submandibular Gland	Painful Swelling on right side of floor of mouth with occasional pus discharge	17x9 mm	Mandibular Occlusal Radiograph	Surgical Excision under Local Anesthesia
7.	Nithin Mathew Cherian, Sankar Vinod Vichattu, Ninan Thomas, and Aabu Varghese	Wharton's Duct Sialolith of Unusual Size: A Case Report with a Review of the Literature Volume 2014 Article ID 373245 https://DOI.org/10.1155/2014/373245	36/M	Right Submandibular Gland	Pain & Swelling during eating	3x1cm	Panoramic Radiograph Occlusal Radiograph	Evacuation of Sialolith under Local Anesthesia
8.	Ademir Franco, Mayara Jessica de Carvalho Mattos, Francine Ferrari, José Manoel Dos Reis Neto, Luiz Carlos Carta Gambus, Paulo Henrique Couto Souza, Soraya de Azambuja Berti-Couto	Massive Submandibular Sialolith: Complete Radiographic Registration and Biochemical Analysis through X-Ray Diffraction Case Rep Surg 2014;2014:659270. DOI: 10.1155/2014/659270. Epub 2014 Sep 2	47/F	Left Submandibular Gland	Local Pain, hampered mouth opening, Edema with Purulent Discharge	20 mm Weight: 0.593gm	Occlusal Radiograph Panoramic Radiograph	Removal of Sialolith under General Anesthesia with repeated Submandibular massage in posteroanterior direction
9.	Sabit Demircan, Sabri İşler	Case reports: Giant sialolith PMID: 26205915 DOI: 10.1038/sj.bdj.2015.583	62/M	Left Submandibular Gland	Intermittent Swelling exacerbated by eating Recently become	30x15 mm	Occlusal Radiograph	Submandibular gland resection under General Anesthesia

					painful			
10.	Thiago de Paula Oliveira· Isaac NiltonFernandes Oliveira· Eduardo CarvalhoPaesPinheiro· Renata Caroline Ferreira Gomes· Pietro Mainenti	Giant sialolith of submandibular gland duct treated by excision and ductal repair: a case report PMID: 26420563 PMCID: PMC9444645 DOI: 10.1016/j.bjorl.2015.03.013	42/M	Right Submandibular Gland	Hardness in the affected area	3.0x1.0 cm	Computed Tomography	Intraoral Surgical excision & ductal repair
11.	SelçukArslan· ErkanVuralkan· BengüÇobanoğlu· Ahmet Arslan· Ahmet Ural	Giant sialolith of submandibular gland: report of a case PMID: 25848088 PMCID: PMC4385898 DOI: 10.1093/jscr/rjv043	42/M	Left Submandibular Gland	Recurrent Pain, Swelling & Redness in the affected area	35x25x15 mm	Computed Tomography	Submandibular Gland Resection
12.	ThimmarasaBhovi, Prashant Jaju, SakshiOjha and PreetiBhadouria	Giant submandibular sialolith in an old female patient: A case report and review of literature DOI: 10.4103/jiaomr.JIAOMR_242_15	50/M	Right Submandibular Gland	Swelling on right side of floor of mouth No associated pain or pus discharge	35 mm Weight-13gms	Mandibular Occlusal Radiograph OPG	Intraoral sialolithotomy & Sialodochoplasty
13.	Jae-Seek You, Su-Gwan Kim, Ji-Su Oh, and Na-Ra Shin	Treatment of giant sialolithiasis on wharton's duct Oral Biol Res 2017; 41(1): 40-44 https://DOI.org/10.21851/obr.41.01.201703.40	60/F	Left Submandibular Gland	Periodic Pain & Edema	47x12 mm	Panoramic Radiograph Computed Tomography	Sialolith was divided into 2~3 parts & removed by an intraoral approach
14.	Sandeep Pachisia, Gaurav Mandal, SudiptoSahu, and Sucharu Ghosh	Submandibular sialolithiasis: A series of three case reports with review of literature PMCID: PMC6444375 PMID: 30996853 DOI: 10.4081/cp.2019.1119	#1 40/M #2 26/M #3 75/M	Left Submandibular Gland Swelling below tongue Right Submandibular Gland	Recurrent episodes of pain, difficulty in swallowing, swelling in neck Pain for 1 week No associated discharge of pus or bleeding from area Swelling & Pain during Swallowing	1.5x1 cm weight-0.07gms 5x8.5 mm Weight-0.03gms 1x3cm	Mandibular Occlusal Radiograph Mandibular Occlusal Radiograph Mandibular Occlusal Radiograph	Intraoral Removal under Local Anesthesia Intraoral removal under Local Anesthesia Sialolithotomy under Local Anesthesia
15.	João Batista da SILVEIRA JUNIOR, Joaquim Barbosa MATIAS NETO, Ildeu ANDRADE JUNIOR, Herminia Marques CAPISTRANO	Multiple sialolithiasis in submandibular gland duct: a rare case report https://DOI.org/10.1590/1981-863720200002920180103	37/F	Left Submandibular Gland	Decreased Salivary secretion in affected area	9 sialoliths with size range from 1 mm to 6mm On intraoral palpation-25mm	Occlusal Radiography of Mandible Panoramic Radiography	Surgical removal under Local Anesthesia
16.	FerhatAyrancı, Mehmet MelihOmezli, DamlaTorul, CaglaSunar, Leyla Koc	Sialolith of the Submandibular Gland: A Case Report December 2020; 6(3):407-411 DOI: 10.19127/mbsjohs.817042	40/M	Left Submandibular Gland	Swelling & Pain during eating	16x8 mm	Occlusal Radiography Panoramic Radiography	Surgically removed via intraoral approach under regional anesthesia
17.	Thanion Soopanit, Warut Pongsapich, Prachya Maneeprasopchoke	Giant accessory submandibular sialolithiasis: A case report https://DOI.org/10.1016/j.xocr.2020.100204	54/M	Right Submandibular Gland	No Swelling/ Pain	6x4x3.3 cm	Computed Tomography	Submandibular Gland extirpation with stone removal
18.	J Anand; A Suresh; AK Desai	A giant submandibular sialolith - How to manage? S. Afr. dent. j. vol.75 n.7 Johannesburg Aug. 2020 http://dx.DOI.org/10.17159/2519-0105/2020/v75no7a7	69/M	Left Submandibular Gland	Pain & diffuse swelling on left side of floor of mouth, aggravated with eating	2.2x1.9 cm Weight-3.33gms	Mandibular Occlusal Radiograph, CBCT	Surgical excision of sialolith under Local anesthesia
19.	How Kit Thong, IyliaAjmal Othman, RoszalinaRamli, and Primuharsa Putra Sabir Husin Athar	Painless Giant Submandibular Gland Sialolith: A Case Report PMCID: PMC8654052 PMID: 34926020 DOI: 10.7759/cureus.19429	71/M	Right Submandibular Gland	Painless Swelling Intraorally, Pus at Wharton's duct orifice, Normal Blood	6x5 cm	Computed Tomography of Neck	Excision of right submandibular gland under General Anesthesia

					Investigations			
20.	Maryam Sahwan, Fatema Alasfoor	Submandibular Gland Duct Giant Sialolith: Case Report and Literature Review Bahrain Medical Bulletin, Vol. 43, No. 1, March 2021	Young man	Right Submandibular gland	Painful Right Submandibular area swelling; worsened with eating Normal Blood investigations	40 mm in diameter	Panoramic dental X-Ray	Transoral sialolithotomy under Local Anesthesia
21.	Dr. Gokul Venkateshwar Dr. Eekta Keswani Dr. Veenita Singh Dr. Swapna Nayan Dr. Tanvi Mahale Dr. Nargis Rahman	LARGE ASYMPTOMATIC SIALOLITH OF WHARTON'S DUCT- A CASE REPORT ISSN: 0975-3583, 0976-2833 VOL12, ISSUE 03, 2021	60/M	Left Submandibular gland (Wharton's Duct)	No extraoral swelling was palpable No Pain or pus discharge	3x2cm	OPG Occlusal view x-ray USG	Excision of sialolith under General Anesthesia
22.	H.K. Omokanye, O.A. Wuraola, A.A. Baba, F.E. Ologun	Physiochemical characterization of a giant submandibular gland stone in a Nigerian patient https://DOI.org/10.1016/j.adoms.2021.100120	50/M	Right Submandibular Gland	Hypokalemia between 2.3 & 2.8 mmol/L Serum Magnesium 0.87mmol/L	6x5cm	Computed Tomography	Surgical excision of submandibular gland
23.	Jit-Swen Mao Yu-Chien Lee Jessie Chao-Yun Chi Wan-Ling Yi Yung-An Tsou Chia-Der Lin Chih-Jaan Tai Liang-Chun Shih	Long-term rare giant sialolithiasis for 30 years: A case report and review of literature World J Clin Cases. 2023 Aug 6;11(22):5382-5390. DOI: 10.12998/wjcc.v11.i22.5382.	75/F	Right Submandibular Gland	Painless swelling, Elevated WBC count (13800/uL)	35x20 mm	Computed Tomography	Excision of Right Submandibular Gland & Sialoliths using extraoral approach
24.	Fawzia Butt	Transoral Approach Used to Remove a Giant Sialolith https://DOI.org/10.1177/27528464231158454	38/M	Left Submandibular Gland	Asymptomatic hard swelling	45x40x25mm	OPG Computed Tomography	Under Local Anesthesia, stone was removed via mucosal incision
25.	Konstantinos Chaidas Sergios Lialiaris Angeliki Vasiliki Pavlou Michael Katotomichelakis Sotirios Papouliakos	A Rare Case of a Giant Sialolith Within Wharton's Duct PMID: 37041900 PMCID: PMC10082938 DOI: 10.7759/cureus.35969	72/M	Right Submandibular Gland Duct	Worsened Right Submandibular Swelling, Local Pain, Tenderness & mild odynophagia, Absence of salivary flow	58x17 mm	Computed Tomography	Intraoral Removal of large stone via open surgery under Local Anesthesia

Conflict of Interest

Not available.

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Not available.

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