JULY 31, 2020 • VOLUME 4 • ISSUE 7

PRINT ISSN 2519-2086 • ONLINE ISSN 2522-1965

DT Journal

7 2020

Journal of Diagnostics and Treatment of Oral and Maxillofacial Pathology

Editors
Oleksii Tymofieiev • Rui Fernandes
(Kyiv, Ukraine • Jacksonville, FL, USA)

omf publishing

Official Journal of the
Ukrainian Association for
Maxillofacial and Oral Surgeons

DTJournal.org

U-Impl®
SWITZERLAND

№ R3M 804 252 B2

Сертифікат відповідності
технічного регламенту
щодо медичних виробів

Switzerland Aarbergerstrasse 107A, CH-2502
Biel, Phone/Fax +41 323230188
info@u-impl.com
www.u-impl.com

About the Journal: Aims and Scope

JULY 2020 • VOLUME 4 • ISSUE 7
www.dtjournal.org

Official Title

Journal of Diagnostics and Treatment of Oral and Maxillofacial Pathology

Common Short Title

DTJournal originated from the name of the official web site (www.dtjournal.org) of the journal.

Standard Abbreviation: ISO 4

J. Diagn. Treat. Oral Maxillofac. Pathol.

International Standard Serial Number (ISSN)

Print ISSN 2519-2086 | Online ISSN 2522-1965

Aims and Scope

This is a monthly peer-reviewed oral and maxillofacial surgery journal focused on: Microvascular and jaw reconstructive surgery, dental implants, salivary gland tumors/diseases, TMJ lesions, virtual surgical planning, implementation of ultrasonography into the practice of oral and maxillofacial surgeons.

Editorial Board (EB) Composition

- EB shows significant geographic diversity representing 25 opinion leaders from 13 countries: Brazil, Canada, Colombia, Greece, Hong Kong (SAR, China), India, Israel, Italy, Slovak Republic, Spain, Ukraine, United Arab Emirates, and United States.
- The majority of the EB Members have a discernible publication history in Scopus, Web of Science, and journals with a high impact factor.
- The publication records of all EB members are consistent with the stated scope and published content of the journal.
- The journal has a several full-time professional editors.

Frequency

12 print/online issues a year (from January 2020)

Publication History

2017: 4 issues a year
2018: 4 issues a year
2019: 10 issues a year
2020: 12 issues a year

Publishing Model

Journal combines a *hybrid* and *delayed open access* publishing models. The articles of all types, except Editorials, are immediately in open access. Editorials became an open access publication too after 3-month embargo period.

Article Processing Charge (APC)

During hard times of Covid-19 pandemic our journal trying to support authors by reducing the APC by 50%. And by the end of August 2020 the APC will be 100 USD and 50 USD (excluding taxes) depending on the article`s type. Details at website: dtjournal.org.

14 Types of Articles Currently Published by the Journal

Editorials/Guest Editorials/Postscript Editorials, Images in Oral & Maxillofacial Surgery, Case Reports/Case Series, Original Articles, Review Articles, Discussions, Paper Scans (*synonyms*: Review of Articles, Literature Scan), Book Scans (*synonym*: Book Reviews), Letters to the Editor (*synonym*: Letters), Viewpoints, and Obituaries.

Registration: Ministry of Justice of Ukraine

Registration: July 28, 2016
Re-Registration: May 21, 2019 (Certificate: КВ № 23999-13839ПР)

Co-Founders

1. Shupyk National Medical Academy of Postgraduate Education.
2. Private Higher Educational Establishment "Kyiv Medical University."
3. OMF Publishing, Limited Liability Company.

Publisher

OMF Publishing, LLC is an academic publisher focused on medical and linguistic sciences.
Address: 13-A Simferopolska Street, Office 121, Kyiv 02096, Ukraine.

Crossref Membership

OMF Publishing, LLC is a member of Publishers International Linking Association, Inc. which doing business as a Crossref. OMF Publishing`s active membership: From February 2017 to present.

Official Journal of

Ukrainian Association for Maxillofacial and Oral Surgeons

Ukrainian Association for Maxillofacial and Oral Surgeons (UAMOS)

Address: 4-A Profesora Pidvysotskoho Street, Kyiv 01103, Ukraine.
Tel., fax: +38 044 528 35 17.
Website: uamos.org.

Subscription Index

In Ukraine: 60077 | In Donetsk/Luhansk Regions: 88263.
See page A5.

Editorial Board

JULY 2020 • VOLUME 4 • ISSUE 7
www.dtjournal.org

TANTUM VERDE®

INFORMATION LEAFLET
for the medicinal product

Composition:
active substance: **benzydamine hydrochloride**;
100 mL of solution contain benzydamine hydrochloride 0.15 g;
excipients: ethanol 96%, glycerol, methyl parahydroxybenzoate (E 218), flavor (menthol), saccharin, sodium hydrocarbonate, Polysorbate 20, Quinoline Yellow (E 104), Patent Blue V (E 131), purified water.

Dosage form. Oromucosal solution.
Basic physical and chemical properties: a clear green liquid with a typical mint flavor.

Pharmacotherapeutic group. Dental preparations. Other agents for local oral treatment.
ATC code: A01A D02.

Pharmacological properties.
Pharmacodynamics.
Benzydamine is a non-steroidal anti-inflammatory drug (NSAID) with analgesic and antiexudative properties.

Clinical studies have shown that benzydamine is effective in the relief of symptoms accompanying localized irritation conditions of the oral cavity and pharynx. Moreover, benzydamine has anti-inflammatory and local analgesic properties, and also exerts a local anesthetic effect on the oral mucosa.

Pharmacokinetics.
Absorption through the oral and pharyngeal mucosa has been proven by the presence of measurable quantities of benzydamine in human plasma. However, they are insufficient to produce any systemic pharmacological effect. The excretion occurs mainly in urine, mostly as inactive metabolites or conjugated compounds.

When applied locally, benzydamine has been shown to cumulate in inflamed tissues in an effective concentration due to its ability to permeate through the mucous membrane.

Clinical particulars.
Indications.
Symptomatic treatment of oropharyngeal irritation and inflammation; to relieve pain caused by gingivitis, stomatitis, pharyngitis; in dentistry after tooth extraction or as a preventive measure.
Contraindications.
Hypersensitivity to the active substance or to any other ingredients of the product.

Interaction with other medicinal products and other types of interaction.
No drug interaction studies have been performed.

Warnings and precautions.
If sensitivity develops with long-term use, the treatment should be discontinued and a doctor should be consulted to get appropriate treatment.

In some patients, buccal/pharyngeal ulceration may be caused by severe pathological processes. Therefore, the patients, whose symptoms worsen or do not improve within 3 days or who appear feverish or develop other symptoms, should seek advice of a physician or a dentist, as appropriate.

Benzydamine is not recommended for use in patients hypersensitive to acetylsalicylic acid or other non-steroidal anti-inflammatory drugs (NSAIDs).

The product can trigger bronchospasm in patients suffering from or with a history of asthma. Such patients should be warned of this.

For athletes: the use of medicinal products containing ethyl alcohol might result in positive antidoping tests considering the limits established by some sports federations.

Use during pregnancy or breast-feeding
No adequate data are currently available on the use of benzydamine in pregnant and breastfeeding women. Excretion of the product into breast milk has not been studied. The findings of animal studies are insufficient to make any conclusions about the effects of this product during pregnancy and lactation.

The potential risk for humans is unknown.

TANTUM VERDE should not be used during pregnancy or breast-feeding.

Effects on reaction time when driving or using machines
When used in recommended doses, the product does not produce any effect on the ability to drive and operate machinery.

Method of administration and doses.
Pour 15 mL of TANTUM VERDE solution from the bottle into the measuring cup and gargle with undiluted or diluted product (15 mL of the measured solution can be diluted with 15 mL of water). Gargle 2 or 3 times daily. Do not exceed the recommended dose.

Children.
The product should not be used in children under 12 years due to a possibility of ingestion of the solution when gargling.

Overdosage.
No overdose has been reported with benzydamine when used locally. However, it is known that benzydamine, when ingested in high doses (hundreds times higher than those possible with this dosage form), especially in children, can cause agitation, convulsions, tremor, nausea, increased sweating, ataxia, and vomiting. Such acute overdose requires immediate gastric lavage, treatment of fluid/salt imbalance, symptomatic treatment, and adequate hydration.

Adverse reactions.
Within each frequency group, the undesirable effects are presented in order of their decreasing seriousness.

Adverse reactions are classified according to their frequency: very common (≥ 1/10); common (≥ 1/100 to <1/10); uncommon (≥ 1/1,000 to <1/100); rare (≥ 1/10,000 to <1/1,000); very rare (<1/10,000); frequency unknown (cannot be estimated from the available data).

Gastrointestinal disorders: rare – burning mouth, dry mouth; *unknown* – oral hypesthesia, nausea, vomiting, tongue edema and discoloration, dysgeusia.

Immune system disorders: rare – hypersensitivity reaction, *unknown* - anaphylactic reaction.

Respiratory, thoracic and mediastinal disorders: very rare –laryngospasm; *unknown* – bronchospasm.

Skin and subcutaneous tissue disorders: uncommon – photosensitivity; *very rare* – angioedema; *unknown* – rash, pruritus, urticaria.

Nervous system disorders: unknown – dizziness, headache.

TANTUM VERDE contains methyl parahydroxybenzoate, which can cause allergic reactions (including delayed-type reactions).

Shelf life. 4 years.

Storage conditions.
Do not store above 25°C. Keep out of reach of children.

Packaging.
120 mL of solution in a bottle with a measuring cup; 1 bottle per cardboard box.

Dispensing category.
Over-the-counter medicinal product.

Manufacturer.
Aziende Chimiche Riunite Angelini Francesco A.C.R.A.F. S.p.A., Italy.

Location of the manufacturer and its business address. Via Vecchia del Pinocchio, 22 – 60100 Ancona (AN), Italy.

Date of the last revision of the text.
September 26, 2018.

Information leaflet is
APPROVED by
Order of the
Ministry of Health of Ukraine
No. 636 dated 01.10.2015
Registration Certificate
No. UA/3920/01/01

Subscription in Ukraine

JULY 2020 • VOLUME 4 • ISSUE 7
www.dtjournal.org

Frequency of the *Journal of Diagnostics and Treatment of Oral and Maxillofacial Pathology*: 12 issues (synonym: numbers) per year.

Subscription index in Ukraine: 60077.
Subscription index for Donetsk and Luhansk Regions: 88263.

Three ways of individual/institutional subscription of print version of the *Journal*:

1. At Ukrposhta post at the territory of Ukraine.
2. At the website www.presa.ua.
3. At the website www.dtjournal.org (from September 1, 2020).

Issues	Fee in 2020
1 issue	$ 4[12] USD (103[08] UAH)
3 issues	$ 12[36] USD (309[24] UAH)
6 issues	$ 24[73] USD (618[48] UAH)
12 issues	$ 49[47] USD (1,236[96] UAH)

Content

of the Volume 4 • Issue 7 • July 2020

COURTESY

Journal`s cover image (virtual surgical planning for a segmental mandibular reconstruction with fibula transplant) is courtesy of Rui P. Fernandes, MD, DMD, FACS, FRCS.

Image was taken from the article: Fernandes RP, Quimby A, Salman S. Comprehensive reconstruction of mandibular defects with free fibula flaps and endosseous implants. *J Diagn Treat Oral Maxillofac Pathol* **2017**;1(1):6–10.

Editorial

Introducing a New Editorial Board Member: Anastasiya Quimby, DDS, MD

Oleksii O. Tymofieiev[a], Ievgen I. Fesenko[b], & Evangelos G. Kilipiris[c]

It's a special honor for me to be invited and I am beyond grateful for the opportunity to make my motherland proud!
—Dr. Quimby (personal communication, 2020)

A keystone of the journal`s growth and reputation is uniting the best specialists from all around the world within the Editorial Board (EB). As we know, not only the highly experienced surgeons are invited to the EB but also those who simultaneously accelerate the academic progress and show a discernible publication history in the Web of Science.

Anastasiya Quimby, DDS, MD is a Director, Head and Neck Microvascular Reconstructive Surgery Program and Assistant Professor, Department of Oral and Maxillofacial Surgery, NOVA Southeastern University, Fort Lauderdale, Florida, United States. Dr. Quimby`s (Fig 1) scholar portfolio is so impressive: book chapter[1] and a lot of peer-reviewed works related with cutting-edge reconstructive techniques[2-5].

Thanks to the Dr. Quimby`s inspiring support the number of EB members who move reconstructive surgery forward increased to 6 opinion surgeons: Drs. Antonyshyn, Bunnell, Fernandes, Hanna, Massarelli, and Quimby.

We are enormously honored to be with Dr. Quimby in one team and hope to make our collaboration with her as comfortable and productive as possible.

FIGURE 1. Dr. Quimby (*left*) and Dr. Kilipiris (*right*) during the Congress in Munich, Germany (2018).

REFERENCES

1. Quimby A, Salman SO. Surgical evaluation and airway assessment of patients with OSA. In: Salman SO, editor. Modern management of obstructive sleep apnea. 1st ed. Berlin: Springer; **2019**:25–37.
2. Weyh A, Nocella R, Abdelmalik M, Pucci R, Quimby A, Bunnell A, Fernandes R. An analysis of unplanned readmissions after head and neck microvascular reconstructive surgery. *Int J Oral Maxillofac Surg* **2020**;S0901-5027(20)30162-4 [article in press].
3. Weigh AM, Quimby A, Fernandes RP. Three-dimensional computer-assisted surgical planning and manufacturing in complex mandibular reconstruction. *Atlas Oral Maxillofac Surg Clin North Am* **2020**;28(2):145–50.
4. Quimby A, Guevara C, Manlove A, Pirgousis P, Steinberg B. Surgical repair of dog bites based on esthetic considerations: UF Jacksonville Level I Trauma Center and Wolfson's Children's Hospital experience. *Oral Surg Oral Med Oral Pathol Oral Radiol* **2018**;126(5):e241.
5. Al Shetawi AH, Quimby A, Fernandes R. The cervicofacial flap in cheek reconstruction: a guide for flap design. *J Oral Maxillofac Surg* **2017**;75(12):2708.e1–2708.e6.

[a] Editor in Chief, Kyiv, Ukraine.
E-mail: *tymofeev@gmail.com* (Oleksii Tymofieiev)

[b] Managing Editor, Kyiv, Ukraine.
E-mail: *i.i.fesenko@dtjournal.org* (Ievgen Fesenko)

[c] Director, Journal Development Department; Bratislava, Slovak Republic.
E-mail: *varonos@live.co.uk* (Evangelos Kilipiris)

Cite article as: Tymofieiev OO, Fesenko II, Kilipiris EG. Introducing a new editorial board member: Anastasiya Quimby, DDS, MD. *J Diagn Treat Oral Maxillofac Pathol* 2020;4(7):111.

Paper received 19 July 2020
Accepted 30 July 2020
Available online 31 July 2020

https://dx.doi.org/10.23999/j.dtomp.2020.7.1.

Salivary Glands` Conditions | Ultrasound: Case

Sialoliths in Ipsilateral Bartholin`s and Wharton`s Duct: The First Clinical and Ultrasound Report

Dmytro S. Nikulin[a], Ievgen I. Fesenko[b], & Olha S. Cherniak[c,*]

SUMMARY

Sialoliths in sublingual gland is the rarest condition among sialolithiasis in other major salivary glands. Only in 0.4 percent of cases the salivary stone notes in sublingual gland. In our English literature review we count 8 articles which describe sialoliths located within or around the sublingual glands. Nevertheless, in none of those cases a simultaneous sialolithiasis of the submandibular and sublingual gland was noted. Although in one case the authors described a sonogram of sialolith in the sublingual gland, the sonogram of the gland and its ductal system was not presented. Here we present the first ever published clinical and ultrasound report of combined ductal sialolithiasis of sublingual and submandibular glands in a 78-year-old female. Also, Zhang et al`s classification of duct system patterns of the sublingual glands based on 60 cadaveric and 63 clinical cases is analyzed.

Kyiv, Ukraine

[a] Oral Surgeon, Center of Maxillofacial Surgery, Kyiv Regional Clinical Hospital (place of work at moment of material collection).

[b] PhD, Assistant Professor, Department of Oral and Maxillofacial Surgery, Private Higher Educational Establishment "Kyiv Medical University"(current position).
Oral Surgeon, Physician of Ultrasound Diagnostics, Center of Maxillofacial Surgery, Kyiv Regional Clinical Hospital (place of work at moment of material collection).

[c] Physician of Ultrasound Diagnostics, Head, Department of Ultrasound, Regional Diagnostic Center, Kyiv Regional Clinical Hospital.

* Corresponding author address: 1 Bahhovutivska Street, Kyiv 04107, Ukraine.
Department of Ultrasound, Regional Diagnostic Center, Kyiv Regional Clinical Hospital.
E-mail: *cherniak.os@gmail.com* (Olha Cherniak)

Please cite article as: Nikulin DS, Fesenko II, Cherniak OS. Sialoliths in ipsilateral Bartholin`s and Wharton`s duct: the first clinical and ultrasound report. *J Diagn Treat Oral Maxillofac Pathol* 2020;4(7):112–8.

Paper received 3 May 2020
Accepted 9 June 2020
Available online 31 July 2020

httpi://dx.doi.org/10.23999/j.dtomp.2020.7.2.

INTRODUCTION

Sialoliths in sublingual gland is the rarest condition among sialolithiasis in other major salivary glands.[1,2] Only in 0.4 percent of cases the salivary stone (*synonyms*: sialolith, salivary calculus, and concrement) notes in sublingual gland.[1]

Ultrasound (US) appearance of sialoliths in submandibular/parotid gland and its ducts is perfectly described in many publications.[3-5] Ultrasonographic and clinical pattern of mucus plugs are also recently highlighted.[6] But, in English literature is absent the data which reported ultrasound images (*synonym*: sonograms) of sialoliths located in both the main duct of the sublingual gland (ie, Bartholin`s duct) and in ipsilateral duct of the submandibular gland (ie, Wharton`s duct). In our English literature review we count 8 articles which describe sialoliths located within or around the sublingual glands.[1,7-13] But in English literature the data are absent which reported a simultaneous sialolithiasis of the submandibular and sublingual gland. Despite in one case the authors described US of sialolith in the sublingual gland, the sonogram of the gland was not presented.[13] Until recently, no ultrasonographic appearance of sublingual gland`s ductal system was shown.

We presented the first ever published clinical and US report of combined sialolithiasis of sublingual and submandibular glands in a 78-year-old female. Also, Zhang et al`s classification of duct system patterns of the sublingual glands based on 60 cadaveric and 63 clinical cases is analyzed.[14]

CASE

In May 2015, a 78-year-old female presented to the maxillofacial surgery center with chief complaints of the salivary colics and moderate firm swelling in the right submandibular region. Bimanual palpation revealed painful and swelled right submandibular gland. Intraoral examination showed diffuse swelling of the right sublingual area with moderate mucosal erythema. No fluid milked from the right sublingual caruncle.

US examination (*synonym*: ultrasonography) was performed with 12-3 MHz linear probe (*synonym*: linear transducer) (model HD11 XE, Philips). Gray scale US revealed enlarged ill-defined right submandibular and sublingual gland. Structure of which were less echogenic than the contralateral glands. Dilated intraglandular duct and sonographic architecture of the right submandibular gland is shown in Figure 1.

According to the sonograms the Bartholin`s duct (Fig 2) of the right sublingual gland joined the Wharton`s duct and opened together at the sublingual caruncle. US picture in that case represented type 2 of Zhang et al`s classification of the duct system patterns in the sublingual glands.[14]

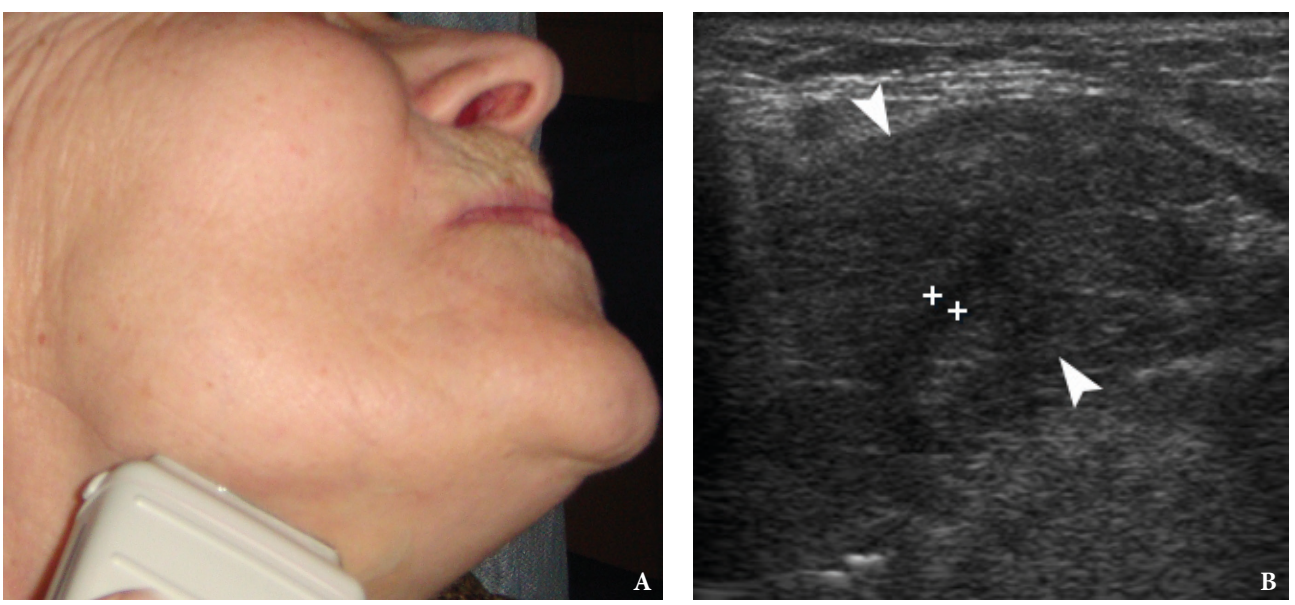

FIGURE 1. Image **A** shows position of linear probe. On gray scale sonogram (**B**) notes dilated intraglandular duct (is indicated by '+' calipers) measured 1.6 mm in the right submandibular gland (*arrowheads*).

Intraglandular duct system of the right sublingual gland was dilated. Also, in the significantly dilated lumen of the Bartholin`s duct a hyperechoic curvilinear body measured ~2.8 mm was visualized. Another bright curvilinear echo measured ~0.9 cm was located in the area of fusion between the Bartholin`s and Wharton`s duct. Both bodies created the artifacts of complete posterior shadowing (*synonym*: acoustic shadowing).

US appearance of both ipsilateral glands with its ducts corresponds to the diagnosis of exacerbation of chronic calculous sialadenitis[2] of sublingual and submandibular glands (*synonym*: obstructive sialadenitis of sublingual and submandibular glands due to sialoliths). And the sialithsectomy was chosen as a surgical tactic due to the intraductal localization of the calculi in Bartholin`s and Wharton`s duct.

Removal of the salivary stones (*synonyms*: sialolithotomy,[15] sialolithectomy[13,16]) was done under local anesthesia. Sialolith which located in the Wharton`s duct was removed in two parts during a first stage and is visualized at Figure 3 as yellowish stone measured 0.55 cm. Smaller one, a 0.3-cm stone, was removed in a second stage. Removal of the stones accompanies with receiving of insignificant volume of the suppurated saliva. Post-operative recommendations included massage of the right submandibular gland and non-steroidal anti-inflammatory drugs.

Regression of the clinical and ultrasound symptoms of obstruction in both glands was noted on the next day after the removal of calculi. At 1-month follow-up ultrasonography the right submandibular (Fig 4) and sublingual gland are visualized as ill-defined organs and has hypoechoic heterogenic structures comparing with contralateral glands. That fact indicates on irreversible inflammatory changes of the glands` parenchyma. Nevertheless, intraglandular ducts dilatation was absent.

DISCUSSION

This is a case of highly effective using of ultrasonography in the practice of oral and maxillofacial surgeons for diagnostics and treatment of extremely rare sialolithiasis in both Bartholin`s and Wharton`s duct.

Correct analysis of sonograms was based not only on understanding of basic US principles but also on perfect knowledge of examined body area, possible pathologic conditions, and clinical thinking.

So, the shape of the sublingual gland resembles

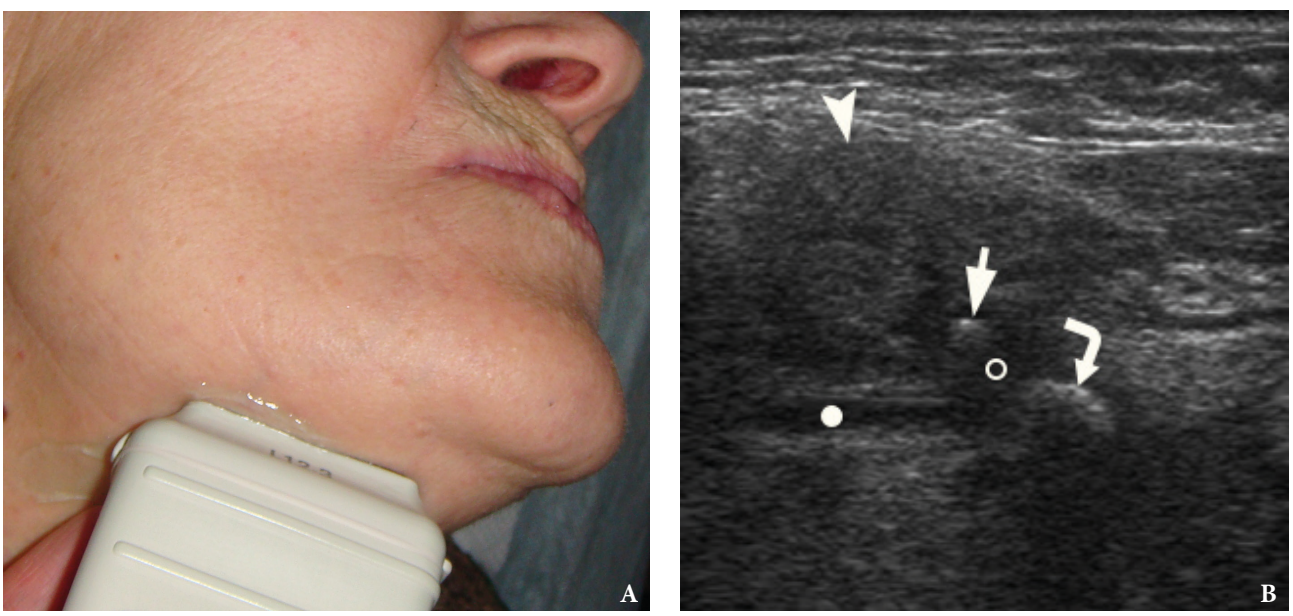

FIGURE 2. A 78-year-old woman with symptoms of acute obstructive submandibular sialadenitis. Linear probe placed in a position (**A**) for US examination of the right sublingual gland (*arrowhead*). Gray scale sonogram (**B**) shows dilated Wharton `s duct (*white dot*), small sialolith (*arrow*) within the significantly dilated Bartholin `s duct (*circle*), and bigger stone (*curved arrow*) in a place where the major duct of sublingual gland joins the duct of the submandibular gland. Acoustic shadowing noted behind each calculus.

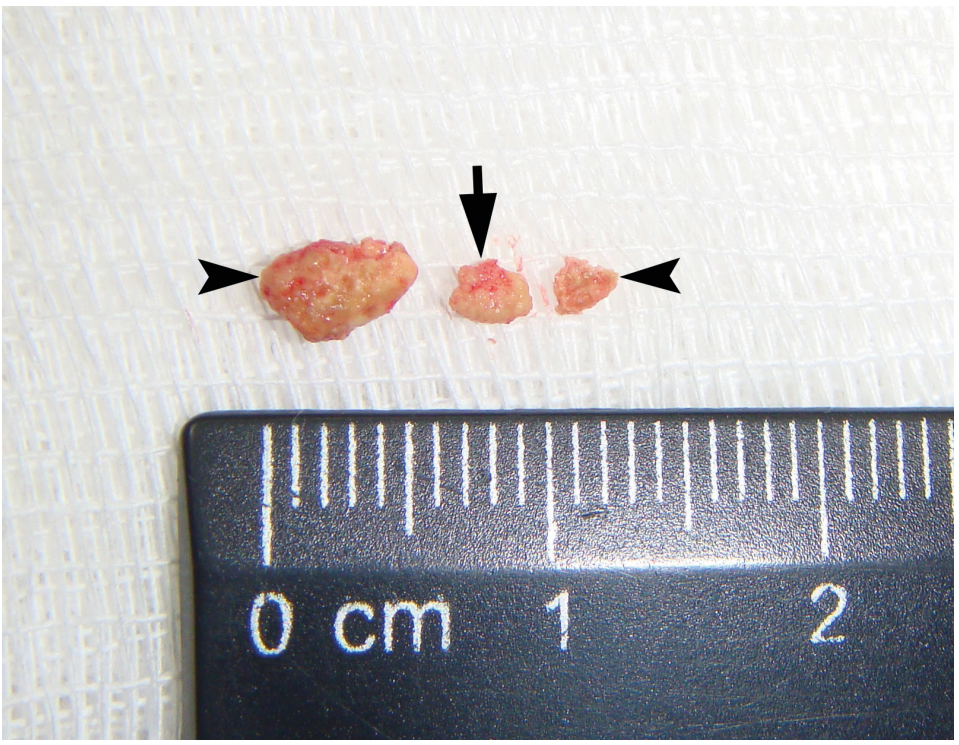

FIGURE 3. Salivary stones after removal. Two parts of one 0.55-cm sialolith located in the Wharton `s duct are labeled by *arrowheads* and ~0.3-cm calculus located in the main Bartholin `s duct is indicated by *arrow*.

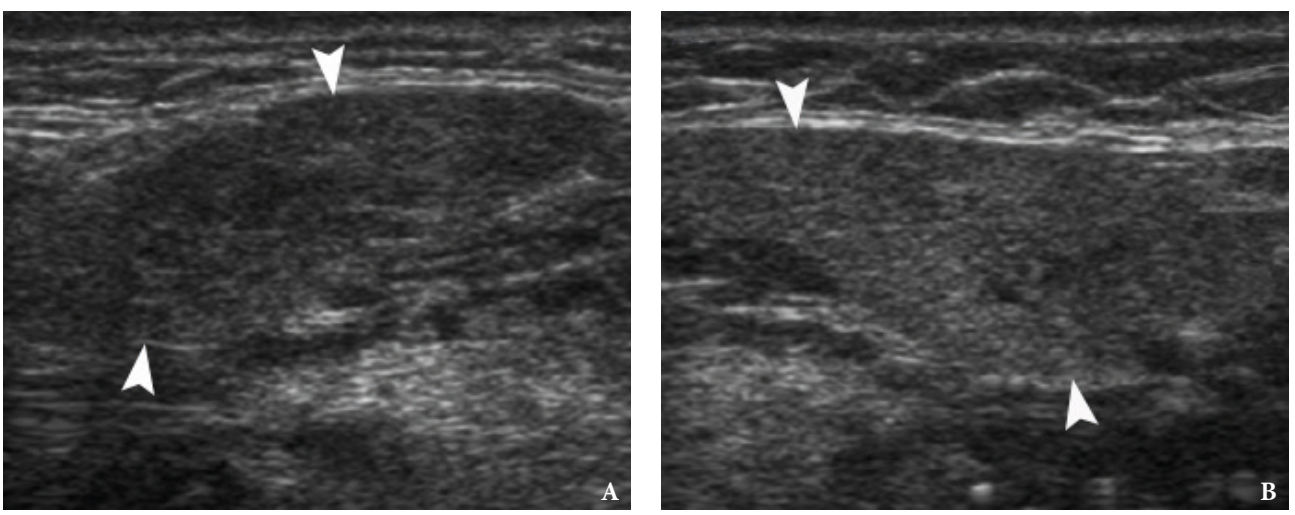

FIGURE 4. 1-month follow-up ultrasonography. Gray scale sonograms show comparison of right (**A**) and left (**B**) submandibular glands (*arrowheads*). Right submandibular gland is ill-defined and has a hypoechoic heterogenic structure comparing with contralateral gland. That indicates on irreversible inflammatory changes of the gland `s parenchyma. Intraglandular duct dilatation is absent.

the large tadpole[17] or almond[18]. The typical anatomical features of the sublingual gland are next: consists of two parts (head and tail), lack of capsule/fascial sheath, surrounded by loose connective tissue,[18] the tail in some cases is in contact with submandibular gland.[17] In contrast to the parotid and submandibular glands, the anatomy and number of ducts of the sublingual salivary gland can be in one of three anatomical types what is represented in Table 1.[14] The minor ducts is also termed as "fine ducts,"[14] "ducts of Rivinus"[17] or "Rivini`s ducts"[18]. The Bartholin`s duct not is attached to the floor of mouth mucosa[17], but Rivini`s ducts (a group of ducts) firmly attached to the mucous membrane and penetrated it. Number of minor ducts varies in the literature, indicated not only from 8 to 15 ducts openings,[14] but also 15-30 salivary ductules.[17] This is why it is so difficult to dissect the sublingual gland from mucosa at the anterior (head) part of the gland. Variations of Bartholin`s duct origin according to the different studies is highlighted in Table 2.

So, in cases when the duct systems of the submandibular and sublingual glands are united (ie, type 2 of anatomic variation)[14] for the better understanding of possible pathologic condition, like sialolithiasis or obstructive sialadenitis, it is possible to apply the term "two salivary glands, one duct system." This thesis is proved and highlighted by our case ductal system which belongs to type 2. In the similar pattern 2 ductal systems the calculus which is located in the Wharton`s duct in area of junction with Bartholin`s duct can theoretically provoke obstructive sialadenitis of the sublingual gland or even formation of own calculi in the sublingual gland and vice versa.

Ying et al noticed in post-sialadenectomy cases the communication between Bartholin`s and Wharton`s duct and the fact that "viscous saliva in the relatively stagnant environment within the residual part of the Wharton's duct further facilitates sialolith formation."[19]

We agree with Güvenç et al, due to complicated anatomy of the ducts in sublingual-submandibular gland system, the origin of the calculi in sublingual region is difficult to find.[13] It can be an explanation why among 8 previously reported cases of sialolithiasis in the area of sublingual gland (Table 3) the indicated locations of salivary stones was not always the sublingual gland itself[8,9,11], but also a sublingual region[7,10,12,13].

In the majority of reported cases with sublingual gland sialolithiasis the gland was removed. In our case, precise US diagnostics of intraductal localization of sialoliths and successfully performed sialolithsectomy allows to manage the obstructive sialadenitis and to avoid sublingual and submandibular glands removal.

TABLE 1. Zhang et al `s Classification of Duct System Patterns of the Sublingual Glands Based on 60 Cadaveric and 63 Clinical Cases.[14]

Duct System Pattern	Description	Mean Diameter	Percent in Cadaveric and Clinical Cases
Type 1	Only minor ducts of the sublingual gland communicating with the oral mucous membrane.	0.98 ± 0.10 mm	36.7 and 36.8%
Type 2	The major duct of sublingual gland fused with the middle part of Wharton`s duct.	2.13 ± 0.52 mm	40 and 52.9%
Type 3	Bartholin`s duct coursed separately from the Wharton`s duct and opened at the sublingual caruncle.	3.25 ± 1.26 mm	23.3 and 10.3%

TABLE 2. Variations of Bartholin `s Duct Origin According to the Different Studies.

Bartholin`s Duct Origin	Title and Year of Publication
The Bartholin`s duct originates from the center of the gland.	Clinical and anatomic study on the ducts of the submandibular and sublingual glands (2010).[14]
Sublingual gland is drained from the anterior part of the gland through the Bartholin's duct.	Histopathology of the salivary glands (2014).[18]
The tail, when present (>65%), is a single discrete secretory unit, which drains only by a Bartholin`s duct.	Sublingual gland (2018).[17]

TABLE 3. Articles Describing Calculi within and around the Sublingual Gland.

#	Patient: Age (Yrs) and Gender	Presented Imaging	No. of Sialoliths and Its Location	Simultaneous Sialolithiasis/ Obstructive Sialadenitis of the Ipsilateral Submandibular Gland	Removal of the gland	Article`s Title and Year of Publication
1	Not indicated	Not indicated	1	Not mentioned	Not mentioned	Sialolithiasis. A survey on 245 patients and a review of the literature (1990).[1]
2	28/F	X-Ray + CT	22: inside and around the sublingual gland	No	Yes	Multiple sialoliths in sublingual gland: report of a case (2002).[7]
3	12/F	CT	5: within the sublingual gland	No	Yes	Sialolithiasis in the sublingual gland (2003).[8]
4	50/M	CT	1: within the sublingual gland	No	Yes	Sublingual gland sialolithiasis: a case report (2007).[9]
5	59/M	X-Ray + CT	1: in area of the sublingual gland	No	Yes	Giant sublingual sialolith leading to dysphagia (2010).[10]
6	35/F	X-Ray	5: in the sublingual gland	No	Yes	Incidental finding of sialolithiasis in the sublingual gland: a diagnostic dilemma (2011).[11]
7	67/F	CT	268: anterior to the sublingual gland	No	No	Multiple sialolithiasis in sublingual gland causing dysphagia (2012).[12]
8	67/M	CT + MR; US is described (1.5- × 1-cm stone in the right sublingual area) but not presented	1: in sublingual area	No; Submandibular gland was absent due to agenesis.	No	Unilateral submandibular gland agenesis associated with sublingual sialolithiasis perforating the floor of the mouth (2017).[13]
9	78/F	US	2: 1 in Bartholin`s duct and 1 in Wharton`s duct	Yes	No	Our case: Sialoliths in ipsilateral Bartholin`s and Wharton`s duct: The first clinical and ultrasound report (2020).

CONCLUSIONS

We hope this rare report may serve as a guiding star for further ultrasound investigation of pathologic conditions in sublingual glands and its ductal system. Simultaneously, it can be a new chapter in implementation of ultrasonography into daily practice of oral and maxillofacial surgeons.

ROLE OF CO-AUTHORS

Dmytro S. Nikulin (editing).
Ievgen I. Fesenko (material collection, concept of the article, writing, and editing).
Olha S. Cherniak (material collection).
All authors read and approved the final manuscript.

TERM OF CONSENT

No needed.

FUNDINGS

No funding was received for this study.

ACKNOWLEDGMENTS

The authors are grateful to Dr. Oleksii O. Tymofieiev for the reference advices.

REFERENCES

1. Lustmann J, Regev E, Melamed Y. Sialolithiasis. A survey on 245 patients and a review of the literature. *Int J Oral Maxillofac Surg* **1990**;19(3):135–8.
2. Tymofieiev OO. Manual of maxillofacial and oral surgery [Russian]. 5th ed. Kyiv: Chervona Ruta-Turs; **2012**.
3. Huang F, Caton R, Colla J. Point-of-care ultrasound diagnosis of acute sialolithiasis with sialadenitis. *Clin Pract Cases Emerg Med* **2017**;1(4):437–8.
4. Tymofieiev OO, Cherniak OS. Ultrasound in the detection of floating sialoliths. *J Diagn Treat Oral Maxillofac Pathol* **2019**;3(8):196–7.
5. Konstantinidis I, Paschaloudi S, Triaridis S, Fyrmpas G, Sechlidis S, Constantinidis J. Bilateral multiple sialolithiasis of the parotid gland in a patient with Sjögren's syndrome. *Acta Otorhinolaryngol Ital* **2007**;27(1):41–4.
6. Cherniak OS, Fesenko II. Effectiveness of ultrasound in verification of the mucus plugs and sialoliths of the Wharton`s duct. *J Diagn Treat Oral Maxillofac Pathol* **2019**;3(5):144–53.
7. Choi J, Kim IK, Oh NS. Multiple sialoliths in sublingual gland: report of a case. *Int J Oral Maxillofac Surg* **2002**;31(5):562–3.
8. Hong KH, Yang YS. Sialolithiasis in the sublingual gland. *J Laryngol Otol* **2003**;117(11):905–7.
9. Liao LJ, Hsiao JK, Hsu WC, Wang CP. Sublingual gland sialolithiasis: a case report. *Kaohsiung J Med Sci* **2007**;23(11):590–3.
10. Güngörmüş M, Yavuz MS, Yolcu U. Giant sublingual sialolith leading to dysphagia. *J Emerg Med* **2010**;39(3):e129–e130.
11. Pace C, Ward S. Incidental finding of sialolithiasis in the sublingual gland: a diagnostic dilemma. *Dent Update* **2011**;38(10):704–5.
12. Eyigor H, Osma U, Yılmaz MD, Selcuk OT. Multiple sialolithiasis in sublingual gland causing dysphagia. *Am J Case Rep* **2012**;13:44–6.
13. Güvenç IA, Eşki E, Yerli H. Unilateral submandibular gland agenesis associated with sublingual sialolithiasis perforating the floor of the mouth. *Clin Surg* **2017**;2:1638.
14. Zhang L, Xu H, Cai ZG, Mao C, Wang Y, Peng X, Zhu ZH, Yu GY. Clinical and anatomic study on the ducts of the submandibular and sublingual glands. *J Oral Maxillofac Surg* **2010**;68(3):606–10.
15. Cho SH, Han JD, Kim JH, Lee SH, Jo JB, Kim CH, Kim BJ. Removal of submandibular calculi by surgical method and hydraulic power with curved needle: a case report. *J Korean Assoc Oral Maxillofac Surg* **2017**;43(3):182–5.
16. Zenk J, Constantinidis J, Al-Kadah B, Iro H. Transoral removal of submandibular stones. *Arch Otolaryngol Head Neck Surg* **2001**;127(4):432–6.
17. Bradley PJ. Sublingual gland. *Oper Tech Otolayngol Head Neck Surg* **2018**;29(3):168–76.
18. Hellquist H, Skalova A. Histology. In: Histopathology of the salivary glands. Berlin Heidelberg: Springer-Verlag; **2014**.
19. Ying X, Kang J, Zhang F, Dong H. Recurrent sialoliths after excision of the bilateral submandibular glands for sialolithiasis treatment: a case report. *Exp Ther Med* **2016**;11(1):335–7.

Benign Clinical Conditions: Case

Decompression, Enucleation and Carnoy's Solution as a Conservative Management of an Odontogenic Keratocyst: A Case Report

Andres Pauwels[a,*], Costanza E. Lozano[b], Juan Pablo López[c], Juan C. Munevar[d], & Sergio M. Viafara-Garcia[e]

SUMMARY

Odontogenic keratocyst (OKC) is a controversial pathology in terms of designation and treatment because it is a locally aggressive cyst that through its history has had different names and a number of alternatives for its management, such as enucleation, cryotherapy, decompression, Carnoy's solution (CS) application or peripheral osteotomy. All the techniques having different results in relapse rates some with more advantages than others; however, until now there are no studies with sufficient data to define which is the best surgical technique to treat the OKC. We report the case of a 48-year-old man diagnosed with OKC who was treated combining different techniques. Further follow-up at the 3-, 6-, 10- and 14-month marks and three years, showed complete recovery and no evidence of recurrence. Therefore large and invasive mandibular cysts could be treated by decompression, followed by enucleation, peripheral ostectomy and then the application of CS to the bony cavity. This approach seems to be effective in the management of large and invasive mandibular cysts OKC attenuating recurrence until long follow up and impacting quality life instead of invasive techniques such as hemimandibulectomy.

[a] Oral and Maxillofacial Surgeon, Professor Universidad El Bosque. Department of Oral Health, Hospital Universitario Fundación Santa Fe de Bogotá, Bogotá, D.C., Colombia.

[b] Oral and Maxillofacial Surgeon, Professor Universidad El Bosque. Department of Oral Health, Hospital Universitario Fundación Santa Fe de Bogotá, Bogotá, D.C., Colombia.

[c] Private practice, Bogotá, D.C., Colombia.

[d] Associate Professor, Unit of Oral Basic investigation (UIBO), School of Dentistry, Universidad El Bosque, Bogotá, D.C., Colombia. Department of Oral Health, Hospital Universitario Fundación Santa Fe de Bogotá, Bogotá, D.C., Colombia.

[e] Assistant Professor, Unit of Oral Basic investigation (UIBO), School of Dentistry, Universidad El Bosque, Bogotá, D.C., Colombia. Department of Oral Health, Hospital Universitario Fundación Santa Fe de Bogotá, Bogotá, D.C., Colombia.
Centro de Investigación e Innovación Biomédica (CIIB), Universidad de Los Andes, Santiago, Chile.

* Corresponding author's address: Hospital Universitario Fundación Santa Fe de Bogotá, Bogotá, D.C., Colombia. Postal address: 110111.
Tel.: +57 (1) 6030303 – ext. 5818, 5814, 5833.
Email: *ahapauwels@yahoo.ar* (Andres Pauwels)

Emails of the co-authors:
lozanoconstanza@yahoo.com (Costanza Lozano)
juanpasa23@gmail.com (Juan Pablo López)
munevarjuan@gmail.com (Juan Munevar)
viafarasergio@gmail.com (Sergio Viafara-Garcia)

Please cite article as: Pauwels A, Lozano CE, López JP, Munevar JC, Viafara-Garcia S M. Decompression, enucleation and Carnoy's solution as a conservative management of an odontogenic keratocyst: a case report. *J Diagn Treat Oral Maxillofac Pathol* 2020;4(7):119–24.

Paper received 27 March 2020
Accepted 6 May 2020
Available online 31 July 2020

httpi://dx.doi.org/10.23999/j.dtomp.2020.7.3.

INTRODUCTION

Odontogenic keratocyst (OKC) is an odontogenic cyst whose name has presented multiple changes in the last years due to its aggressive behavior and its high rate of recurrence in the surgical site.[1] It was first described in 1876 and classified by Phillipsen in 1956 and although in 2005 the World Health Organization (WHO) recommended the term cystic neoplasm,[1] currently, the OKC returned its original nomenclature.[2,3] In the maxilla, OKC has been considered as the main odontogenic and aggressive cysts with an important recurrence rate in the mandibular angles.[1] It can be a unilocular or multilocular lesion with sclerotic borders and cortical expansion frequently associated with missing tooth.[1] Histologically, the parakeratinized epithelium is lined of five to eight cell layers with areas of squamous metaplasia[4,5] and it has been described as a primary cysts of the jaws, related with skeletal abnormalities as the bifid ribs, hand and foot abnormalities, beside of alterations in the skin associated to basal cell carcinomas.

The OKC treatment is also controversial despite of the enucleation is used as basic management in detaching the cyst from the bone cavity, complementary techniques have arisen. Some authors reported that the treatment with enucleation alone can result in a 60% of recurrences.[6] Thus, other adjuvant treatments have been used. For instance, the previous decompression minimizes tissue damage, and is one of the most common therapeutic options mainly used in larges cases of OKC. However its effectiveness is questioned due to the high recurrence of the OKC which has increased the interest to combine with others adjuvants techniques such as the application of Carnoy's solution (CS) or marginal ostectomy with rotary instruments, both frequently used after enucleation as a complement which seeks to eliminate adjacent satellite cyst bone tissue.[7,8] Nevertheless, other authors reported that even with CS or peripheral osteotomy the recurrences varied from 0 to 100%.[9] Thus, although there is not a clear reduction in the recurrences yet, the treatment of OKC using CS with marginal ostectomy as adjuvant treatment have been proposed to surgically husking the cyst out of the bone without leaving any macroscopic remnant mainly through the cauterizing effect of CS.[10]

Our aim in this OKC clinical case report is addressing its clinical, radiographic, and treatment aspects, focusing on contributing to a better understanding of the complementary techniques as decompression and CS to minimize damage tissue and recurrence rate through a conservative protocol.

CASE

This case report conformed to precepts of the Declaration of Helsinki on medical protocol and ethics and was approved by the Hospital Ethics Committee. Informed consents were signed by the participant and exemption was granted given the use of de-identified patient variables.

A 48-year-old man was referred to the Oral and Maxillofacial Surgery Service at Hospital Universitario Fundación Santa Fe de Bogotá (Bogotá, D.C., Colombia), with a chief complaint of intermittent discomfort and slight pain on the right side near the mandibular angle and slowly progressing swelling of 7 months duration.

At the initial consultation, the patient reported a history of hypertension that was well controlled. Clinical extraoral examination showed mild intraoral contour deformity and the mandibular nerve was intact with no compromise in sensation and there is not compromise of facial soft tissue. Intraoral examination revealed a well-defined, localized swelling, fluctuant, and non-tender on palpation. The overlying mucosa was the same color as that of adjacent mucosa and presented with no sign of inflammation.

The panoramic radiograph correlated with the clinical findings showing a well-defined multilobular radiolucent lesion, cystic-appearing lesion with a thin sclerotic rim which encompassed most of the right mandibular ramus that extended from the 47 until mandibular notch and the lesion measured 4.2 × 3.3 cm (Fig 1).

A fine-needle aspiration revealed a yellow-colored highly viscous fluid, then incisional biopsy of the cyst was performed in addition to placement of a decompression tube (Fig 2). The histopathological analysis and features with hematoxylin and eosin stain showed an OKC pattern lesion.

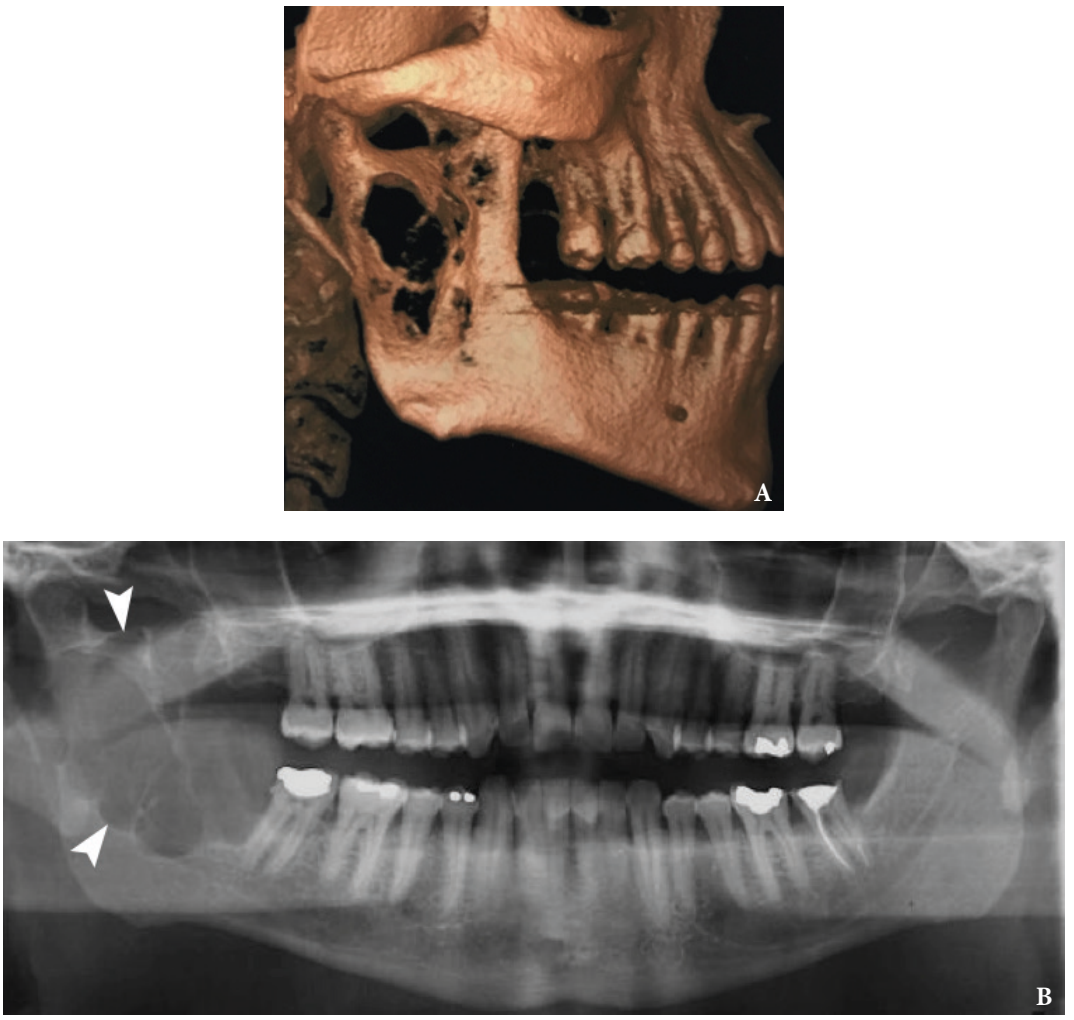

FIGURE 1. Three-dimensional computed tomography reconstruction (**A**) of the right mandibular ramus with OKC in a 48-year-old man. Panoramic radiography (**B**) shows that OKC (*arrowheads*) was measured 4.2 × 3.3 cm and extended from the tooth 47 to mandibular notch. Both images correlated with the clinical findings showing a well-defined multilobular radiolucent lesion.

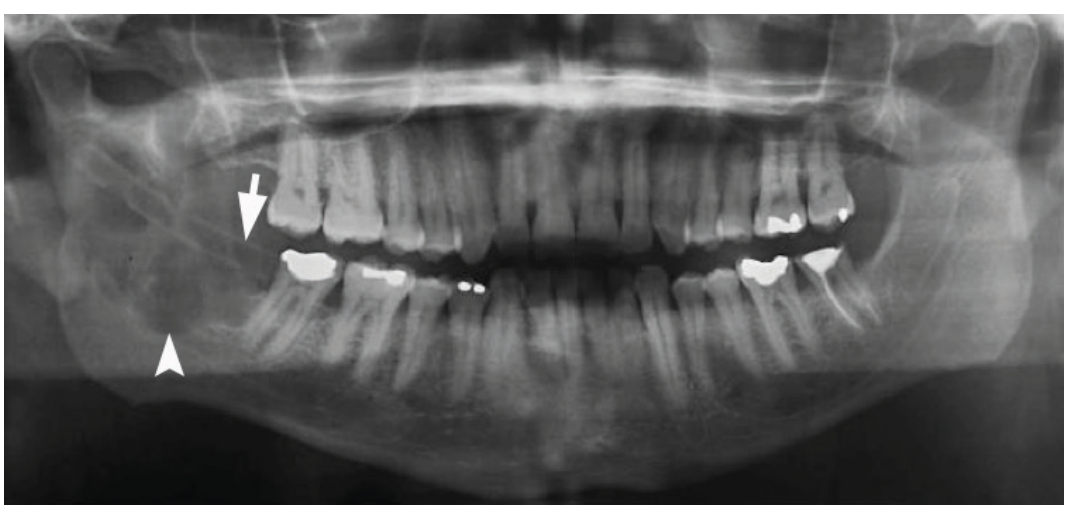

FIGURE 2. A decompression tube (*arrow*) on large multilocular lesion (*arrowhead*) with variable sclerotic margins in the right mandibular ramus.

Owing to the close location of the lesion to mandibular nerve the patient was compliant with three-times-daily direct flushes of saline rinses through the decompression tube in addition to monthly routine clinical follow-ups.

After 10 months, a panoramic imaging showed a considerable 3-dimensional regression of the lesion, which showed a bony rim surrounding the decompressed lesion of 1 × 1 cm (Fig 3).

Once it noted the successful outcome of decompression, the patient was scheduled for the third stage of the planned surgical procedure of enucleation. A sulcular incision was made with a posterior extension to create a triangular flap. Then, the lesion was exposed by creating a bony window using piezoelectric. The lesion was enucleated, including the fistulous tract previously created by the decompression tube. After enucleation, curettage was completed not only by removing a layer of the surrounding bone using a round bur, but also with the use of CS both strategies for preventing recurrence of satellite cysts. The wound was closed primarily. The cyst specimen was sent for histopathological evaluation where the final diagnosis was confirmed as an OKC. The patient returned 1 week later to assess post-surgical wound healing, and returned for further follow-up at the 3-, 6-, 10- and 14-month marks and three years, which showed complete recovery and no evidence of recurrence (Fig 4).

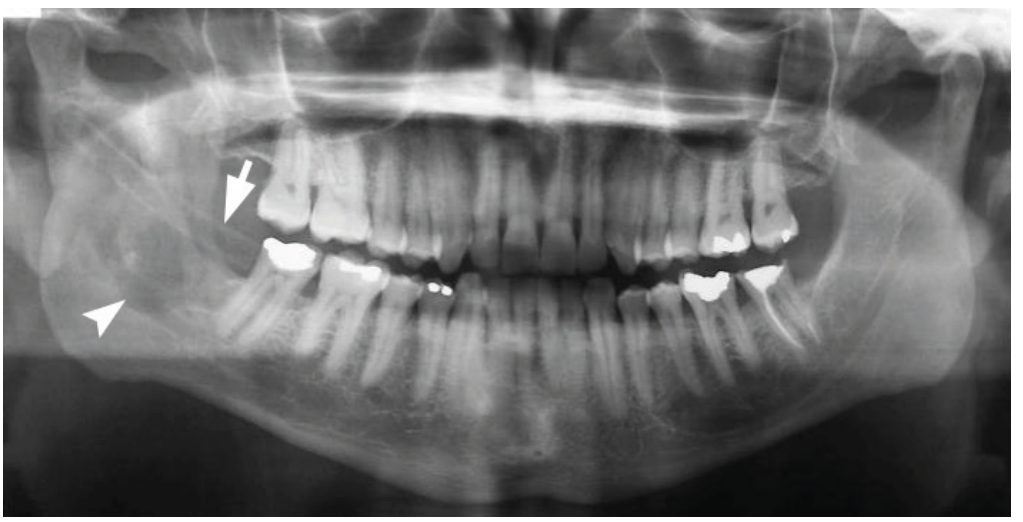

FIGURE 3. 10-month of the decompression treatment performed in order to reduce the cyst (*arrowhead*) with a decompression tube (*arrow*) sutured into the ramus.

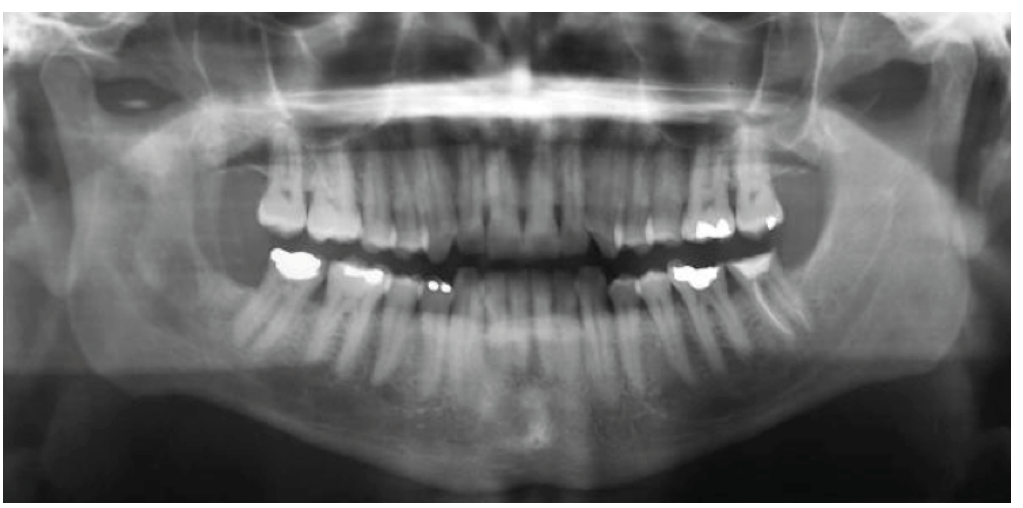

FIGURE 4. Bone repair 3 years after enucleation.

DISCUSSION

Odontogenic cysts are relatively common lesions, however, it is the one of the rare odontogenic cysts, which attracts many researchers, surgeons and pathologists due to its unique characteristics as a highly aggressive and destructive behavior.[1]

The controversial classification of odontogenic cysts also have been transferred toward the surgical treatment, which is mainly categorized in conservative or aggressive surgical approach.[11] The conservative treatment is "cyst oriented" and thus includes decompression, enucleation, with or without curettage or marsupialization; while aggressive treatment is considering in OKC with "neoplastic nature" or friable properti which contribute to its high recurrence rate, and some adjuvant treatments such as a marginal ostectomy and chemical curettage with CS have been proposed.[7,8,11,12]

Large lesions, recurrent cases, and syndromic patients are mostly treated with aggressive approach, but paradoxically, there have been increasing reports that OKC can be treated for partial cure, or even complete cure.[13,14] Minor total recurrence rates has been observed after decompression followed by enucleation (11.9%), which suggest a significant superiority of success for OKC treatments that use decompression followed by enucleation, instead of an initial enucleation or decompression alone.[13] Thus, the histological changes by the decompression generated in the cystic capsule decrease the intramural pressure, that allows the healthy bone to gain space or the gradual reduction of the cyst.[15] However, according to meta-analysis, this histological changes seems not be enough in large lesion with typical neoplastic behavior or persistent growth after incomplete removal.[14]

Some authors have reported that the size of the lesion affects the recurrence rate, suggesting a conservative approach for small OKC (maximum 1 cm in diameter) near alveolar process, and aggressive management for larger lesions near the base of the skull that has invaded soft tissue.[16] Likewise, different authors have demonstrated that in large lesions the effectiveness of conservative treatment increases in combination with adjunctive measures, which is associated with minor recurrence rates.[17] The use of ≥ 2 adjuvant treatments have reduced the recurrence range between 0 and 7.9 percent.[17] Therefore the decompression followed by enucleation can be combined with CS.[17,18] For this reason the purpose of this case report was to highlight the importance of conservative treatment with adjuvant techniques that minimize the damaged tissue to preserve anatomical structures and reduce morbidity to the patient which is mostly recommended for large lesions, recurrent cases and syndromic patients with "neoplastic nature" of OKC.[11,12]

The CS is prepared with ethanol, chloroform, glacial acetic acid and ferric chloride and applied in the cystic cavity during three minutes, followed by a profuse saline rinse wash. This technique has important results in the elimination of recurrent satellite cysts in combination with enucleation and decompression to prevent relapse.[2] The CS has even shown a recurrence of 0% with a follow-up of three years,[18] while modified CS without chloroform showed a rate of 35%, almost 7 times more likely to recurrence, which suggests the use of chloroform in the CS.[19]

CONCLUSIONS

Therefore, despite of absence quality evidence with specific cohort interval that supports the OKC management with chloroform-CS or without chloroform, we recommend that large and invasive mandibular cysts could be treated in combination by decompression, followed by enucleation, peripheral ostectomy and then the application of CS to the bony cavity for no more than 3 minutes which appears to be efficient for treating of OKC by diminishing the recurrence during the most critical period (the first 3 years).

ACKNOWLEDGMENTS

This study was supported in part funding from the Oral Health Service, Hospital Universitario Fundación Santa Fe de Bogotá, Colombia.

DECLARATION OF INTEREST

This research was funded through Hospital Universitario Fundación Santa Fe de Bogotá, Colombia; the authors have expressed none conflict of interests.

ROLE OF CO-AUTHORS

Pauwels A. (material processing).
Lozano C.E. (material processing).
Lopez J.P. (writing and editing)
Munevar J.C. (concept and design).
Viafara-Garcia S.M. (writing and editing).

REFERENCES

1. Pogrel MA. The keratocystic odontogenic tumor. *Oral Maxillofac Surg Clin North Am* **2013**;25(1):21–30.
2. Ribeiro-Júnior O, Borba AM, Alves CAF, Gouveia MMd, Deboni MCZ, Naclério-Homem MdG. Reclassification and treatment of odontogenic keratocysts: a cohort study. *Braz Oral Res* **2017**;18;31:e98.
3. Kennedy RA. WHO is in and WHO is out of the mouth, salivary glands, and jaws sections of the 4th edition of the WHO classification of head and neck tumours. *Br J Oral Maxillofac Surg* **2018**;56(2):90–5.
4. Han Y, Fan X, Su L, Wang Z. Diffusion-weighted MR imaging of unicystic odontogenic tumors for differentiation of unicystic ameloblastomas from keratocystic odontogenic tumors. *Korean J Radiol* **2018**;19(1):79–84.
5. Pogrel MA. The history of the odontogenic keratocyst. *Oral Maxillofac Surg Clin North Am* **2003**;15(3):311–5.
6. Sharif FN, Oliver R, Sweet C, Sharif MO. Interventions for the treatment of keratocystic odontogenic tumours (KCOT, odontogenic keratocysts (OKC)). *Cochrane Database Syst Rev* **2010**;(9):CD008464.
7. Güler N, Sençift K, Demirkol O. Conservative management of keratocystic odontogenic tumors of jaws. *ScientificWorldJournal* **2012**;2012:680397.
8. Johnson NR, Batstone MD, Savage NW. Management and recurrence of keratocystic odontogenic tumor: a systematic review. *Oral Surg Oral Med Oral Pathol Oral Radiol* **2013**;116(4):e271–6.
9. Ecker J, Horst RT, Koslovsky D. Current role of Carnoy's solution in treating keratocystic odontogenic tumors. *J Oral Maxillofac Surg* **2016**;74(2):278–82.
10. Ribeiro JO, Borba AM, Alves CaF, de Gouveia MM, Coracin FL, Guimarães Júnior J. Keratocystic odontogenic tumors and Carnoy's solution: results and complications assessment. *Oral Dis* **2012**;18(6):548–57.
11. Morgan TA, Burton CC, Qian F. A retrospective review of treatment of the odontogenic keratocyst. J *Oral Maxillofac Surg* **2005**;63(5):635–9.
12. Kaczmarzyk T, Mojsa I, Stypulkowska J. A systematic review of the recurrence rate for keratocystic odontogenic tumour in relation to treatment modalities. *Int J Oral Maxillofac Surg* **2012**;41(6):756–67.
13. de Castro MS, Caixeta CA, de Carli ML, Ribeiro Júnior NV, Miyazawa M, Pereira AAC, Sperandio FF, Hanemann J. Conservative surgical treatments for nonsyndromic odontogenic keratocysts: a systematic review and meta-analysis. *Clin Oral Investig* **2018**;22(5):2089–101.
14. Li T. The odontogenic keratocyst: a cyst, or a cystic neoplasm? *J Dent Res* **2011**;90(2):133–42.
15. Oliveros-Lopez L, Fernandez-Olavarria A, Torres-Lagares D, Serrera-Figallo MA, Castillo-Oyagüe R, Segura-Egea JJ, Gutierrez-Perez JL. Reduction rate by decompression as a treatment of odontogenic cysts. *Med Oral Patol Oral Cir Bucal* **2017**;22(5):e643–50.
16. Dammer R, Niederdellmann H, Dammer P, Nuebler-Moritz M. Conservative or radical treatment of keratocysts: a retrospective review. *Br J Oral Maxillofac Surg* **1997**;35(1):46–8.
17. Pogrel MA. Keratocystic odontogenic tumors. *J Oral Maxillofac Surg* **2016**;74(3):438–9.
18. Alchalabi NJ, Merza AM, Issa SA. Using Carnoy's solution in treatment of keratocystic odontogenic tumor. *Ann Maxillofac Surg* **2017**;7(1):51–6.
19. Dashow JE, McHugh JB, Braun TM, Edwards SP, Helman JI, Ward BB. Significantly decreased recurrence rates in keratocystic odontogenic tumor with simple enucleation and curettage using Carnoy's versus modified Carnoy's solution. *J Oral Maxillofac Surg* **2015**;73(11):2132–5.

TANTUM VERDE®

QUICK RELIEF FROM PAIN AND INFLAMMATION IN THE MOUTH AND THROAT[1]

AN INTEGRAL COMPONENT OF THE TREATMENT OF PAIN AND INFLAMMATION IN THE ORAL CAVITY IN 60 COUNTRIES WORLDWIDE![2]

- **JAWS FRACTURES[3]**
- **IMPLANTS PLACEMENT[4]**
- **WOUNDS OF ORAL CAVITY[5]**

Reg. № UA/3920/01/01

LOCAL ANESTHETIC AND ANTI-INFLAMMATORY EFFECT[1]

SUMMARY OF PRODUCT CHARACTERISTICS

NAME OF THE MEDICINAL PRODUCT. Tantum Verde 0.15% mouthwash. QUALITATIVE AND QUANTITATIVE COMPOSITION. Each 100 ml contains: active ingredient: benzydamine hydrochloride 0.15 g (equivalent to 0.134 g of benzydamine). **Therapeutic indications.** Treatment of symptoms such as irritation/inflammation including those associated with pain in the oropharyngeal cavity (e.g. gingivitis, stomatitis and pharyngitis), including those resulting from conservative or extractive dental therapy. **Posology and method of administration.** Pour 15 ml of Tantum Verde mouthwash into the measuring cup, 2-3 times per day, using it either at full concentration or diluted. If diluted, add 15 ml of water to the graduated cup. Do not exceed the recommended dosage. **Contraindications.** Hypersensitivity to benzydamine or to any of the excipient. **PHARMACOLOGICAL PROPERTIES. Pharmacodynamic properties.** Pharmacotherapeutic group: Stomatologic drugs: other agents for local oral treatment, ATC code: A01AD02. Clinical studies demonstrate that benzydamine is effective in relieving suffering from localised irritation of the mouth and pharynx. In addition, benzydamine possesses a moderate local anaesthetic effect. **Pharmacokinetic properties.** Absorption. Absorption through the oropharyngeal mucosa is demonstrated by the presence of measurable quantities of benzydamine in human plasma. These levels are insufficient to produce systemic effects. Distribution. When applied locally, benzydamine has been shown to accumulate in inflamed tissues where it reaches effective concentrations because of its capacity to penetrate the epithelial lining.

Information about medicines. Information for health care professionals for use in professional activities.

1. Інструкція для медичного застосування лікарського засобу Тантум Верде®, розчин для ротової порожнини, РП № UA/3920/01/01, затверджено Наказом Міністерства охорони здоров'я України № 636 від 01.10.2015.
2. http://www.angelinipharma.com/wps/wcm/connect/com/home/Angelini+Pharma+in+the+world/
3. Тимофеев А.А. и др. "Особенности гигиены полости рта для профилактики воспалительных осложнений при переломах нижней челюсти". Современная стоматология 2015;1(75):52–8.
4. 4,5. Tymofieiev O.O. et al"Prevention of inflammatory complications upon surgeries in maxillofacial region". J Diagn Treat Oral Maxillofac Pathol. 2017;1:105–12.

Clinical and CT images are courtesy of: Ievgen Fesenko (Department of Oral & Maxillofacial Surgery, PHEI "Kyiv Medical University", Kyiv, Ukraine), Oleg Mastakov ("SCIEDECE—Scientific Center of Dentistry & Ultrasound Surgery" Kyiv, Ukraine)

ANGELINI

04119, Kiev, Melnikova str. 83D, of. 404.
Tel.: (044) 538-01-26
Fax: (044) 538-01-27

Dileo FARMA