

Oral Mucocele- A Literature Review of Management Alternatives

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Abstract

Oral Mucocele is a common lesion seen in oral cavity which is a benign disease of minor salivary glands. It clinically presents as single, painless, soft, smooth, spherical, translucent and fluctuant nodule with pink to translucent blue observed in reflected light.

The lesion may resolve spontaneously or traumatically with the rupture of the lining, with the release of a characteristic viscous, mucoid fluid. There has been continuous research with an aim to find ways for management having least recurrence rates in various types of oral mucocele. Multiple treatment options have been trialled for eradication of the lesion, including surgical and non-surgical management techniques. The non-invasive methods also comprised of different intra-lesional injections. Many other invasive procedures with added advantages and few shortcomings have also been researched by the Clinicians.

Keywords: Oral Mucocele, Surgical excision, Cryotherapy, Intralesional Injection

Introduction

Oral Mucocele or mucous retention or extravasation phenomenon is a commonly seen oral mucosal lesion. These are benign, mucin containing, generally asymptomatic lesions affecting minor salivary glands more prevalent in children and young adult. It clinically presents as soft, single, painless nodule, with smooth and spherical appearance. It is fluctuant on palpation. The colour may vary from pink to translucent blue. It may occur anywhere along the oral mucosa where salivary glands are present but some areas have predilection for occurrence. Though lower labial mucosa is the most common site of occurrence, cases of mucocele on buccal mucosa, palate and tongue have also been reported.^(1, 2) Oral mucoceles located on the floor of mouth are termed as 'ranula' has a bluish hue, which usually

arises in the body of the sublingual gland and occasionally in the ducts of Rivini or in the Whartons duct.⁽³⁾ The patients diagnosed with mucocele are mostly asymptomatic. The lesion has a tendency to protrude in the oral cavity and therefore these patients report with the complaint of discomfort and interference in speech, mastication and swallowing.⁽⁴⁾

Two schools of thought have been proposed over the years that lead to formation of two histological variants of mucocele i.e. mucous retention phenomenon and mucous extravasations phenomenon. Trauma or constant irritation to the ductal system, obstruction in the ducts is suggested as the most common causes (refer to schematic figure: Figure 1a) of its occurrence.

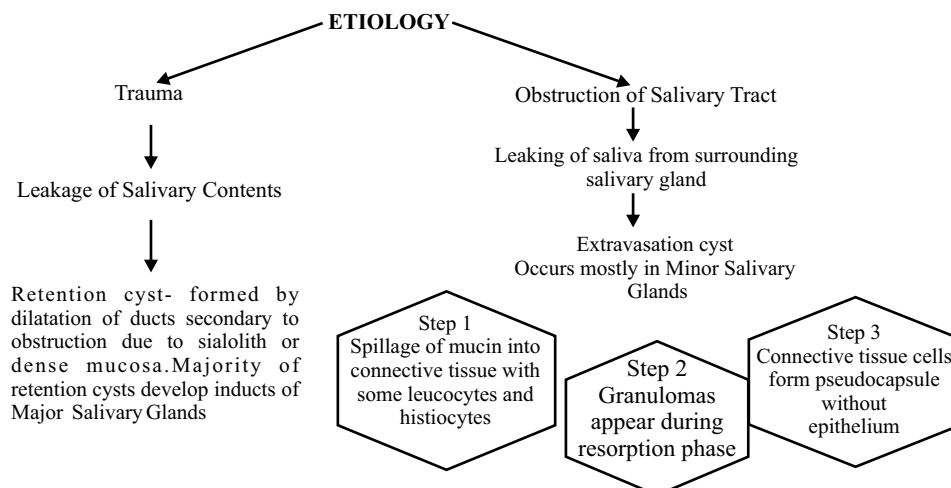


Figure 1a: Possible etiologies in occurrence of Oral Mucocele.

Differential diagnosis of mucocele includes multiple mucosal and submucosal lesions such as salivary gland tumours, fibroma, traumatic neuroma, schwannoma, hemangioma.^(5,6,7,8) Though clinical presentation is typical for diagnosis of oral mucocele, other methods can aid in differential diagnosis. On palpation lipomas and minor salivary gland tumors show no fluctuation while it is present in cysts, mucoceles, abscess, and hemangiomas.⁽⁹⁾ Obstruction due to presence of sialolith can be ruled out by radiographic examination. Other imaging techniques (CT and MRI) can be used to localise and determine origin of the lesion. The protein content and high amylase levels on chemical analysis of its contents disclose positive test for mucocele.⁽¹⁰⁾

Recurrence of these lesions is uncommon if careful technique is employed during the biopsy procedure. The recurrence rate is significantly more common in the younger patients than in the older patients, reveals the review of literature.

Mucocele may resolve spontaneously or rupture of the lining due to inadvertent trauma. This leads to leakage or release of its viscous mucoid content. Owing to this it reduces in size or may completely recede. Once a small perforation has healed, the secretions may accumulate again and the chances of recurrence persist. Various treatment modalities (Figure 1b) have been proposed and tested over the years for such lesions primarily used method is complete removal by scalpel or surgical excision. The main aim of the treatment used is to reduce or eliminate the chances of recurrence. Non-invasive methods also include intra-lesional injections of corticosteroids and various sclerosing agents. Other invasive procedures with added advantages and reduced disadvantages have also been carried out by clinicians and researchers.

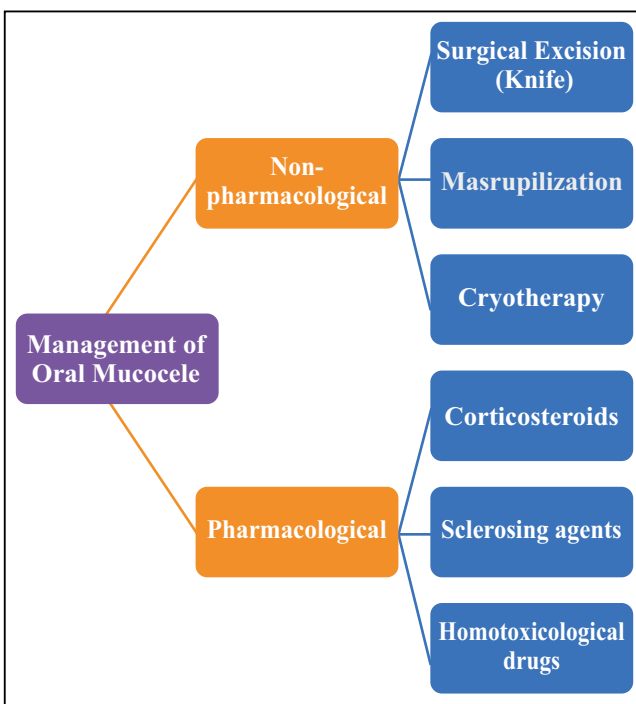


Figure 1 b: Overview of techniques in management of oral mucocele

Discussion

Review of literature reveals various methodology employed by the surgeons in order to remove mucocele in-toto thereby avoiding recurrence. Some of them have been discussed as under.

Most researchers have suggested that the optimal management of mucocele is based on avoidance of trauma. Pandit and Park⁽¹¹⁾ have reported two pediatric cases of ranula which spontaneously resolved 4 months and 2 months, respectively. Seo⁽¹²⁾ et al. suggested that the intraoral ranula greater than 2cm would not reduce spontaneously if the preoperative observation period exceeded 3 months. Chinta⁽¹³⁾ et al reported a case of mucocele of patient presenting with notched incisors. On detailed history taking, the patient’s parents revealed nail biting habit leading to notches along incisal edge. There was recurrence after 4 weeks of excising the lesion with diode laser and restorative procedures of incisal edge build up with composite(Figure 2 A). The constant irritation by the incisors in deep bite was thought be the reason for the recurrence. Excision of the lesion was done again followed by placement of a thermoplasticised splint (erkodur 2 mm) (Figure 2(i), (ii)) for 6 months as an adjunct to intercept the nail biting habit thereby preventing the irritation from incisors. There were no signs of recurrence over the next 6 months of follow up.



Figure 2: (i): Composite build up of notched incisors. (ii): Thermoplasticized splint placement (Courtesy: Chinta M, Saisankar AJ, Birra C, et al.)

Surgical excision: It is the removal of lesion along with the involved minor salivary gland using a scalpel. It is a reliable method for excision of small mucocele in accessible areas.⁽⁶⁾ (Figure 2a)



Figure 2a: Surgical Excision of Mucocele on Lower Labial Mucosa (Courtesy: Chaitanya P, Praveen D, Reddy M. 2017)

Rupture of the membrane during surgical removal makes it difficult to define complete extent of the lesion and hence hinders the complete removal. Shira⁽¹⁴⁾ suggested a technique for such cases wherein alginate impression material (irreversible hydrocolloid) is injected in the cystic cavity and allowed to set which is followed by excision. This ensures proper delineation of the lesion and hence reducing the chances of recurrence. (Figure 2b) A complication has been reported for this technique i.e. the development of a foreign body reaction to the secondary to retention of impression material. If the original lesion has extension into several planes the material flowing along these extensions can be retained unknowingly. Therefore in such technique use of radio opaque impression material can be considered. Though surgical intervention has the least chances of recurrences it has certain limitations. Being an invasive procedure, it leaves a surgical defect. With expansile extent of lesion, the surgical removal will result in several unpleasant complications like damage to adjacent ducts and lip disfigurement.⁽¹⁾ In spite of complete excision chances of recurrence still exist owing to either incomplete removal or severance of surrounding minor salivary glands.



Figure 2b: Injecting alginate impression compound before surgical removal in a case of oral mucocele (Courtesy: Kumaresan, R., Karthikeyan, P., Mohammed, F., & Thapasum Fairozekhan, A. (2013))

Micromarsupialization and its modification:

Marsupialization is a procedure wherein the cyst is cut open and the lining is sutured to the adjacent mucosa to maintain a continuum with the oral cavity and to prevent accumulation of the contents again. If the cavity is also packed with gauze,

extravasation is immediately obstructed and the gauze would also induce fibrosis and help forming a permanent seal. Micromarsupialization was attempted by the surgeons, wherein a silk suture can be placed in the dome of the cyst leading to the formation of an epithelial tract between the surface and the underlying glandular tissue (i.e. a continuation with the external surface), thus preventing accumulation of fluid.^(15,16) (Figure 2c (i))

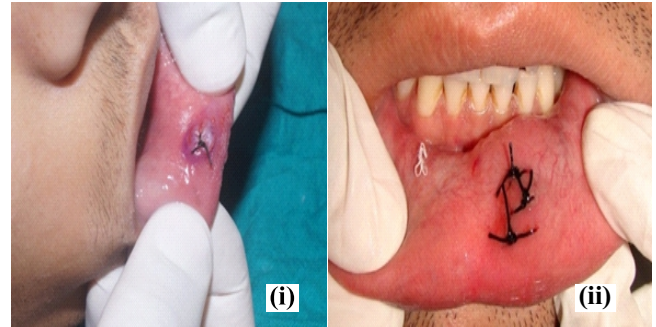


Figure 2 c (i): Micromarsupialization; Figure 2 c (ii): Modified Micromarsupialization: Treatment in a case of lower lip mucocele (Courtesy: Shallu Bansal, Dinesh Kumar Verma, Sandeep Goyal, Manjunath Rai)

The procedure is simple to perform under topical anaesthesia, relatively atraumatic and well tolerated by the patient. The healing is uncomplicated and faster as no open wound exists. Placement of a single suture reduces chances of successful treatment if the suture opens up before 7 days and another suture has to be placed for complete epithelisation exposing the patient to another intervention. On observing these shortcomings, modified micromarsupialization was suggested by Sandrini⁽¹⁷⁾ et al, which included placement of increased number of sutures, resulting in increase in the number of epithelised drainage pathways. Addition of more number of sutures resulted in increase of operating time and delay in healing. Premature loss of one suture before 7 days does not necessitate replacement of sutures if others are intact.⁽¹⁷⁾ (Figure 2c (ii))

Lasers:

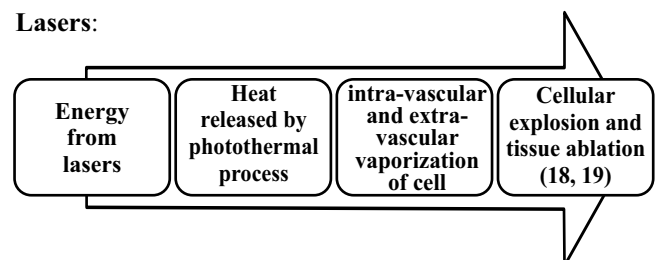


Figure 2d: Mechanism of action of lasers on soft tissue

Laser ablation by CO₂ seems to be a simple, effective and rapid mode of treating oral mucocele (Figure 2d). Lasers can also be indicated for treatment of paediatric and geriatric patients as these groups of patients are less likely to tolerate long procedures.⁽²⁾ Diode laser technology has more patient acceptance and a dental surgeon prefers it due to the following reasons:

- minimal tissue damage
- reduced bleeding
- better wound healing without scarring
- negligible post-operative edema
- reduced intake of analgesics^(2,18,19)(Figure 2e)



Figure 2e: Laser Excision for management of Oral Mucocele (Courtesy: Ahad A, Tandon S, Lamba AK, Faraz F, Anand P, Aleem A)

Major drawback is that it is an expensive equipment to be owned by the dental surgeon and need of adequate protection in the form of eyewear to the patient and operator becomes mandatory. There may be chances of delayed healing and a larger wound site may result if the laser application time is more.

Cryotherapy:

Another part of non-pharmacological modality includes cryotherapy. Commonly used cryogens: Liquid nitrogen (-191°C), Nitrous oxide (-81°C) and Carbon dioxide (-79°C)^(20,21) Liquid nitrogen is most commonly used and is more effective in treatment of soft tissue lesions. Most tissues freeze at -2.2°C , tissue death occurs at a temperature of -20°C , the effectiveness of cryosurgical treatment stems from the formation of extracellular and intracellular ice crystals. The alteration in pH, rapid production of toxic electrolytes, protein denaturation and all of this subsequently leads to cell membrane destruction. (Figure 2f)



Figure 2f: Nitrous oxide cryotherapy in a case of oral mucocele (Courtesy: Aarti Garget al 2014)

A cryoscar shows comparatively lesser amounts of mature collagen than in scars produced by other methods. An important drawback is that the extent or depth to which the laser will effect may vary. This lack of precision leads to difficulty in assessing amount of tissue necrosis. On the other hand inadequate destruction can lead to recurrence and hence mandating another surgery.^(22,23)

Intralesional Corticosteroids: Steroids act as the potent anti-inflammatory agent, have action like a sclerosing agent causing shrinkage of the dilated salivary ducts. Moderately potent corticosteroids (e.g. triamcinolone) have been associated with relapse.⁽²⁴⁾ High potency steroids like dexamethasone (Figure 3) and betamethasone have been used as intra-lesional agents.⁽²⁵⁾ Topical application of a clobetasol propionate in a mucosal adhesive base causes high potency vasoconstriction and anti-inflammatory effect.⁽²⁶⁾



Figure 3: 1 mL of betamethasone intralesional injection and 31-gauge insulin syringe in labial mucocele (Courtesy: Sinha, R., Sarkar, S., Khaitan, T., Kabiraj, A., & Maji, A. (2016))

Intralesional sclerosing agent:

Sclerosing agents have been in use in multiple oral diseases. Their mechanism is a combination of cytotoxic damage induced by denaturation and extraction of surface proteins, dehydration of cells and coagulation and thrombosis when blood is present. A sclerosing agent, Picinabil (OK-432), was made by penicillin treatment of the strain of A-group Streptococcus.⁽⁴⁾ A 27-gauge needle was used for intra-lesional injection therapy. These cytotoxic damage causing products induce a strong local inflammatory reaction at the site of mucocele by activation of neutrophils and monocytes, leading to cytokine production. All these changes lead to fibrinoid necrosis in the vicinity. The effectiveness of OK-432 is affected by the initial size of the lesion and the number and interval of injections.⁽²⁸⁾ Roh⁽²⁷⁾ believed that the number of injections was one to five in intraoral ranula, one to three in plunging ranula. He suggested that the sclerotherapy interval in ranulas should be shorter than 2 weeks because of the higher viscosity of saliva.

Combination of Intralesional Components:

Literature shows the use of a combination of Nickel Gluconate—Mercurius Heel—Potentised Swine Organ Preparations in management of oral mucocele. These three homo-toxicological drugs, were used as primary intervention of paediatric oral mucoceles and ranula act synergistically on foreign body inflammation, triggered by extravasated mucus. These drugs act by activating infiltration of inflammatory cells and production of various cytokines, increasing the endothelial permeability, and resulting in accelerated drainage and fluid flow induce shrinkage of the cystic lesions i.e. pseudo cyst re-absorption, and repairing gland physiology and function.⁽²⁹⁾

Conclusion

Through this article we have attempted to give a brief overview of the various treatment options for oral mucocele. The article puts light on the various methods, their mechanism of actions and each of their advantages and disadvantages.

Summary

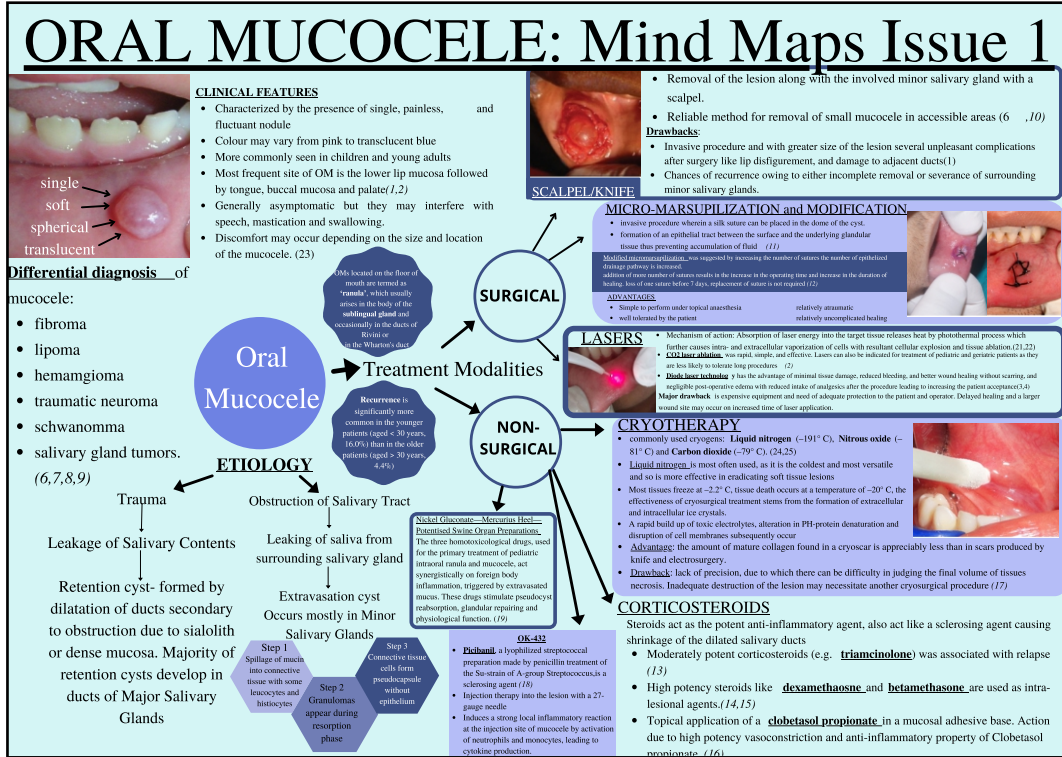


Figure 4: Summary of Clinical features, etiology and management techniques of Oral Mucocele

Source of support : Nil

Conflict of interest : Nil

References

- Oliveira DT, Consolaro A, Freitas FJ. Histopathological spectrum of 112 cases of mucocele. *Braz Dent J.* 1993;4:29-36.
- Yagüe-García J, España-Tost AJ, Berini-Aytés L, Gay-Escoda C. Treatment of oral mucocele-scalpel versus CO2 laser. *Med Oral Patol Oral Cir Bucal.* 2009;14:469-74.
- Piazzetta C. M., Torres-Pereira C., Amenábar J. M. Micro-marsupialization as an alternative treatment for mucocele in pediatric dentistry. *International Journal of Paediatric Dentistry.* 2012;22(5):318–323.
- S. Fukase, N. Ohta, K. Inamura, M. Aoyagi, Treatment of ranula with intracystic injection of the streptococcal preparation OK-432, *Ann. Otol. Rhinol. Laryngol.* 112 (3) (2003) 214—220.
- Baurmash HD. Mucoceles and ranulas. *J Oral Maxillofac Surg.* 2003;61:369-78.
- Valério RA, Queiroz AM, Romualdo PC, Brentegani LG,

The main aim of finding effective treatment option is to reduce or eliminate the chances of recurrence. Though we have summarized the treatment options in this article, various other modifications to these existing methods have been tried and reported.

- Paula-Silva FW. Mucocele and fibroma: treatment and clinical features for differential diagnosis. *Braz Dent J* 2013;24:537-41
- Gudi SS, Sikkerimath BC, Puranik RS, Kasbe SS. Swelling on lower lip...not always a mucocele. *Ann Maxillofac Surg* 2013;3:98-9.
- Chi AC, Lambert PR 3rd, Richardson MS, Neville BW. Oral mucoceles: a clinicopathologic review of 1,824 cases, including unusual variants. *J Oral Maxillofac Surg* 2011;69:1086-93.
- Guimarães MS, Hebling J, Filho VA, Santos LL, Vita TM, Costa CA. Extravasation mucocele involving the ventral surface of the tongue (glands of Blandin-Nuhn) *Int J Paediatr Dent.* 2006;16:435–9.
- Yamasoba T, Tayama N, Syoji M, Fukuta M. Clinicostatistical study of lower lip mucoceles. *Head Neck.* 1990;12:316–20.
- Pandit RT, Park AH. Management of pediatric ranula. *Otolaryngol Head Neck Surg* 2002; 127:115–118.
- Seo, Ji-Hyun, Park, Jung, Kim, Ho, Jeon, Sea-Yuong, Kim, Jin, Ahn, Seong-Ki, Hur, Dong, Kim, Dae, Lee,

- Jong, Surgical management of intraoral ranulas in children: An analysis of 17 pediatric cases - International journal of pediatric otorhinolaryngology. 2009/12/01 20257410.1016/j.ijporl.2009.11.011
13. Chinta M, Saisankar AJ, Birra C, Kanumuri PK. Successful management of recurrent mucocele by diode laser and thermoplasticised splint as an adjunctive therapy. *BMJ Case Rep.* 2016
 14. Kumaresan, R., Karthikeyan, P., Mohammed, F., & Thapasum Fairozekhan, A. (2013). A novel technique for the management of blandin-nuhn mucocele: a case report. *International journal of clinical pediatric dentistry*, 6(3), 201–204.
 15. Francisco AL, Manoel SAF, Pantelis VR (2007) Ranula management: suggested modification in the micromarsupialization technique. *J Oral Maxillofac Surg* 65:1436–1438
 16. Shallu Bansal, Dinesh Kumar Verma, Sandeep Goyal. , Manjunath Rai Comparison of Micromarsupialization and Modified Micromarsupialization for the Management of Mucocoele of Lower Lip: A Prospective Randomized Clinical Trial. *J. Maxillofac. Oral Surg.* (Oct–Dec 2017) 16(4):491–496.
 17. Sandrini FA, Sant’ana-Filho M, Rados PV. Ranula management: suggested modifications in the micromarsupialization technique. *J Oral Maxillofac Surg* 2007; 65:1436–1438.
 18. Goharkhay K, Moritz A, Wilder-Smith P, et al. Effects on oral soft tissue produced by a diode laser in vitro. *Lasers Surg Med.* 1999;25:401-406.
 19. Chawla K, Lamba AK, Faraz F, et al. Treatment of lower lip mucocele with Er,Cr:YSGG laser: a case report. *J Oral Laser Appl.* 2010;10:181-185.
 20. Manu Prasad, Tejraj P Kale, Rajshekhar Halli, Kotrashetti SM, Baliga SD Liquid nitrogen cryotherapy in the management of oral lesions: a retrospective clinical study *J Maxillofac Oral Surg* 2009 8(1):40–42
 21. Yeh CJ (2000) Simple Cryosurgical treatment for oral lesions. *Int J of Oral and Maxillofac Surg* 29(3): 212–216
 22. Toida M, Ishimaru JI, Hobo N (1993) A simple Cryosurgical method for treatment of Oral mucous cysts. *Int J Oral and Maxillofac Surg* 22(6): 353–355.
 23. Re Cecconi D, Achilli A, Tarozzi M, et al. Mucoceles of the oral cavity: a large case series (1994–2008) and a literature review. *Med Oral Patol Oral Cir Bucal.* 2010;15:551-556.
 24. Rupam Sinha, Soumyabrata Sarkar, Tanya Khaitan, Arpita Kabiraj, Anirban Maji *Int J Dent.* 2016; 2016: 2896748. Published online 2016 Oct 16. doi: 10.1155/2016/2896748
 25. Baharvand M., Sabounchi S., Mortazavi H. Treatment of labial mucocele by intralesional injection of dexamethasone: case series. *Journal of Dental Materials and Techniques.* 2014;3(3):128–133.
 26. Luiz AC, Hiraki KR, Lemos CA Jr, Hirota SK, Migliari DA. Treatment of painful and recurrent oral mucoceles with a high-potency topical corticosteroid: a case report. *J Oral Maxillofac Surg* 2008;66:1737-9
 27. J.L. Roh, Primary treatment of ranula with intracystic injection of OK-432, *Laryngoscope* 118 (2) (2006) 169—172
 28. Lee HM, Lim HW, Kang HJ, et al. Treatment of ranula in pediatric patients with intralesional injection of OK-432. *Laryngoscope* 2006; 116:966–969.
 29. Salvatore Garofalo, Vito Briganti, Sebastiano Cavallaro, Ernesto Pepe, Marina Prete, Liana Suteu, Paolo Tavormina. Nickel Gluconate—Mercurius Heel—Potentised Swine Organ Preparations: a new therapeutical approach for the primary treatment of pediatric ranula and intraoral mucocele. *International Journal of Pediatric Otorhinolaryngology* (2007) 71, 247—255