ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)
IJDSIR : Dental Publication Service
Available Online at:www.ijdsir.com
Volume – 7, Issue – 6, November – 2024, Page No. : 28 - 33

Treatment of Oral Mucocele: Diode Laser Vs Intralesional Injection of Sclerosing Agent

[1]Dr. Komal Buktare, PG Student, Department of Oral Medicine and Radiology, Government Dental College and Hospital, Civil hospital, Ahmedabad

[2]Dr. Shilpa Parikh, Professor and PG Guide, Department of Oral Medicine and Radiology, Government Dental College and Hospital, Civil hospital, Ahmedabad

[3]Dr. Jigna Shah, Professor and HOD, Department of Oral Medicine and Radiology, Government Dental College and Hospital, Civil hospital, Ahmedabad

Corresponding Author: Dr. Komal Buktare, PG Student, Department of Oral Medicine and Radiology, Government Dental College and Hospital, Civil hospital, Ahmedabad

Citation of this Article: Dr. Komal Buktare, Dr. Shilpa Parikh, Dr. Jigna Shah, "Treatment of Oral Mucocele: Diode Laser Vs Intralesional Injection of Sclerosing Agent", IJDSIR- November – 2024, Volume –7, Issue - 6, P. No. 28 – 35.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Oral mucoceles are common benign lesions in the oral cavity, typically arising from the extravasation or retention of mucous within minor salivary glands, presenting as painless, soft, bluish swellings. Traditional treatments have included surgical excision, though less invasive options, such as intralesional sclerotherapy and diode laser excision, are gaining popularity. This study aims to compare the effectiveness, safety, and patient outcomes of two minimally invasive treatment modalities for oral mucoceles: diode laser excision and intralesional injection of 3% polidocanol as a sclerosing agent.

Materials and Methods: A total of 13 mucocele cases were included in this hospital-based study, with seven cases treated using intralesional polidocanol injection and six cases treated with diode laser excision. Each patient was assessed post-treatment for recurrence, pain, bleeding, and healing over a follow-up period of three weeks.

Results: Sclerotherapy required multiple injections depending on lesion size, with no major complications apart from minor local discomfort and swelling. Laser excision provided a rapid, nearly bloodless procedure with minimal discomfort and scarring. One case of recurrence was noted in the sclerotherapy group, likely due to habitual trauma.

Conclusion: Both sclerotherapy and diode laser excision demonstrate effective, minimally invasive options for treating oral mucoceles, offering advantages such as reduced postoperative discomfort, faster recovery, and minimal scarring. These methods show potential as alternatives to surgery, though further studies with larger

sample sizes and extended follow-ups are needed to validate long-term efficacy and safety.

Keywords: Mucocele, Sclerotherapy, swelling, Salivary glands

Introduction

Mucocele are defined as mucus-filled cavities, which can appear in the oral cavity, appendix, gallbladder, paranasal sinuses, and lacrimal sac.[1,3,4] The name mucocele is derived from the Latin word's mucus and cocele, which imply cavity and cavity respectively.[1,3] Mucocele is the 17 most common salivary gland lesions seen in the oral cavity.[1,2] The prevalence is considerable, with 2.5 lesions per 1000 people.[3,4] This is the result of accumulation of liquid or mucoid material due to the alteration in the minor salivary gland which causes limited swelling, which are characterized by a rounded, well-circumscribed, transparent, and bluish-colored lesion of variable size. Mostly they are soft in consistency and fluctuate while on palpation. Mucocele is painless and have a tendency to relapse.[1] The two clinical forms are extravasation and retention. Extravasation occurs when fluid escapes into the surrounding soft tissues from injured salivary gland ducts and acini, which is particularly prevalent in small salivary glands. Retention is caused by a blockage of a salivary gland duct, which is frequent in major salivary gland ducts.[1-4] The microscopic analysis shows polymorph nuclear leucocytes, lymphocytes, and plasma cells with fluid filled lumen and eosinophilic clots, along with a majority of lesions surrounded by granulation tissue. The extravasation type is more common with a prevalence of 92%. Different treatment approaches have been proposed in literature such as surgical excision of the lesion with or without associated salivary gland, marsupialization, electrosurgery, cryosurgery, laser excision, high-potency topical corticosteroids, gamma-linolenic acid, OK-432, nickel gluconate-mercurius heel-potentized swine organ preparations, and micro-marsupialization.[4] This study highlights on the management of mucocele treated with different modalities: Intralesional Injection of Sclerosing agent and laser excision.

Materials and Methods

The hospital-based study was conducted between year 2022 to 2024. The permission to undertake this study was obtained from the Institutional Ethics Committee. Written consent was obtained from all patients. Irrespective of age, sex and site total 13 cases of mucocele (mucous extravasation cyst) were included in study. Total 7 cases of mucocele were treated by using intralesional injection of sclerosing agent and 6 cases were treated by using diode laser after clinical diagnosis. Patients were subjected to patch test to rule out any hypersensitivity reaction to the sclerosing agent (3% Polidocanol(60mg/2ml). In present study not single patients were allergic sclerosant.

Armamentarium required for sclerotherapy were insulin syringe, mouth mirror, 3% polidocanol, guaze. Treatment area was disinfected with 0.5% chlorhexidine solution. First topical local anaesthesia was applied over lesion and under aseptic condition, total volume of fluid was aspirate from the lesion by using 21 G syringe. After mucocele shrunk, the periphery of the lesion was compressed to prevent blood backflow. Then slowly 0.5 to 1 ml of 3% polidocanol was injected by using insulin syringe in a circumferential manner in the cavity until the cystic wall turned white. The needle was then withdrawn and the injection area was compressed with a cotton ball for 3 min in case of polidocanol exudation. After injection of 3% polidocanol, observe the lesion for postoperative pain or burning sensation and bleeding

from the lesion after 24 hours and at every week until three injections were given.

For laser excision, Diode laser was used under local anesthesia (2% adrenaline). Laser device emits the photons at a wavelength of 980nm and operate in a continuous emission mode. The delivery of laser light done by a quartz Fiber optics. For treating mucocele, a 300micrometer initiated tip was used. Laser was set according to parameters. All the practitioners and the patients wore laser eye protection. The tip was directed to the base of lesion at a 10-15degree angle. The site was continuously mopped by sterile wet guaze to avoid tissue overheating. Observe the post-operative bleeding, healing of lesion, secondary infection after 24 hours and observe the size of lesion and recurrence of the lesion at every week until 3 weeks.

Patients treated by both techniques were advice, not to bite their lip until local anesthesia wear off on the day of procedure performed and until the healing was not complete by the end of 3 weeks.

Result and Discussion

The initial diagnosis of mucocele was established based on the lesion history and clinical findings.[5] Mucoceles are a fairly common oral pathological lesion and there are not associated with significant morbidity, they can be the cause of discomfort and relapse.[6] Mucocele is the second most common lesion in the oral cavity followed by irritational fibroma.[7]

Advantages of sclerotherapy and laser over surgical excision are that is simple, safe, effective, and minimally invasive procedure, with minimal discomfort to patient and minimal complication compared to surgery.[8] Sclerosing agents are basically irritants that injure the endothelial surfaces, ultimately resulting in the obliteration of space between the surfaces. Polidocanol consists of 95% hydroxypolyethoxydodecane and 5% ethyl alcohol. The former, an urethrane local anesthetic that differs from the more classic ester and amide anesthetic agents by its lack of an aromatic ring, is the active component of the product. Its detergent action induces a rapid over-hydration of endothelial cells, leading to vascular injury. [8,9]

The laser diode was first introduced in dentistry in the mid-1990s. It is manufactured from semiconductor crystals with a short-wave length (800–980 nm, and most recently, 1064 nm) and works by transmitting photo-thermal energy to cells it contacts that causes an increase in temperature, protein denaturation, vaporization, and carbonization. A diode laser has high affinity to hemoglobin and melanin causing an elevation in the temperature and promoting coagulation and hemostasis. A diode laser delivers the energy fiber photothermally in contact with the soft tissue. The fiber optic tip needs to be initiated to focus the laser energy at the contact point into thermal energy and accelerate tissue incisions. The thermal damage zone on the borders of the excisional biopsies is significantly larger with diode laser compared to CO2 laser. Therefore, to control the thermal effect, the tissue temperature is regulated using air and water to cool the surgical site. Further, setting the wattage properly and using continuous or gated pulsing parameters are recommended when using a diode laser to control the thermal effects on the soft tissue.[5]

Total 13(100%) numbers of cases of mucocele were include in study 2(15.38%) cases were found in the 1–20-year age group, 8 (61.53%) cases were found in the 21–40-year age group, and 3(23.03%) case found in above > 40-year age groups with male predominance; lower lip was the most common site 12 (92.30%) lesions out of 13 cases followed by buccal mucosa. Present study shows male predominance with 11:2 male to

female ratio. (Table 1) Out of 13(100%) cases 7(53.84%) cases treated by intralesional injection of 3% polidocanol and 6 (46.15%) cases treated by diode laser excision. Out of 7(100%) cases of mucocele treated by sclerotherapy injection, 6 cases having size between 1-2cm(85.72%) required 3 times weekly interval injections. Therefore, the size of the lesion determines the numbers of injection of sclerotherapy. If the size of the lesion is less than 1 cm (14.28%) then only a single injection of polidocanol is sufficient. Though the size of the lesion dictated the number of injections but were unaffected by age, sex and site of the lesion. No postoperative complications were observed except for local discomfort, and mild bleeding and mild swelling was reported by few cases which resolved within an hour. The swelling was evident due to the inflammatory response induced by polidocanol. (Figure 1 and Table 2)

Total 6 cases treated with diode laser excision. Total 2 cases(33.33%) having a size < 1 cm and 4 cases(66.67%) having size 1-2cm. Mucocele removal with laser provides rapid, bloodless procedure, with minimal if not bleeding, swelling, scaring and post-operative discomfort. [5,10,11] (Figure 2 and Table 3) Only one patient complains of pain after removal of mucocele with laser excision. These results coincide with the findings in previous case reports by Bagher et al. and others.[5,10,11,12]

In this present study, one patient treated by intralesional injection is recurrent. The clinical features and history indicate the recurrence of the lesion: same location, history of trauma, and rapid appearance. Besides, the patient had a habit of biting her lower lip by the borders of the anterior maxillary teeth. The space between incisors and mechanical stimulation may be the cause of mucocele appearance and recurrence [11]. Therefore, the patient was encouraged to stop her bad habit. (Table 4)

Despite the limited number of cases presented and the short-term follow-up of this study, the use of a Sclerosing agent and diode laser appears to present a good alternative treatment to remove mucocele over surgical removal. However, more clinical studies with larger sample sizes and longer follow-up periods are warranted in attempts to improve the management and confirm their efficacy and safety in treatment of oral mucoceles using a Sclerosing agent and diode laser.

Conclusion

The treatment of oral mucocele using sclerotherapy and diode laser presents effective, minimally invasive alternatives to conventional surgical methods. Sclerotherapy, by inducing fibrosis and subsequent lesion regression, and diode laser therapy, through precise tissue ablation and reduced post-operative discomfort, both offer significant advantages. These methods result in shorter recovery times, minimal scarring, and high patient satisfaction. Combining these treatments can further optimize outcomes, tailoring approaches to individual patient needs.

References

1. Nallasivam KU, Sudha BR. Oral mucocele: Review of literature and a case report. Journal of Pharmacy and Bioallied Sciences. 2015 Aug 1;7(Suppl 2):S731-3.
2. More CB, Bhavsar K, Varma S, Tailor M. Oral mucocele: A clinical and histopathological study. Journal of oral and maxillofacial pathology. 2014 Sep 1;18(Suppl 1):S72-7.
3. Deshmukh P, Lanjekar A, Sathawane R, Chandak R, Gaikwad R, Talatule D, Bagde L, Thakare P. Recurrence of mucocele-A case report. Arch Dent Res. 2021;11(2):123â.
4. Agrawal S, Koirala B, Dali M, Shrestha S. Oral mucocele: Various treatment modalities. Journal of

Kathmandu Medical College. 2018 Dec 31;7(3):110-3.

5. Bagher SM, Sulimany AM, Kaplan M, Loo CY. Treating mucocele in pediatric patients using a diode laser: three case reports. Dentistry Journal. 2018 May 9;6(2):13.
6. Foroughiasl P. Cautery versus laser excision of oral mucocele. Journal of Pediatric Surgery Case Reports. 2019 Aug 1;47:101251.
7. Ramkumar S, Ramkumar L, Malathi N, Suganya R. Excision of mucocele using diode laser in lower lip. Case Reports in Dentistry. 2016;2016(1):1746316.
8. Shah JS, Ranghani AF. Sclerotherapy in pyogenic granuloma and mucocele. Journal of Indian Academy of Oral Medicine and Radiology. 2018 Jul 1;30(3):230-4.
9. Liu JL, Zhang AQ, Jiang LC, Li KY, Liu FZ, Yuan DY, Xu K, Fan QC, Liu XB, Zou B, Meng Z. The efficacy of polidocanol sclerotherapy in mucocele of the minor salivary gland. Journal of Oral Pathology & Medicine. 2018 Oct;47(9):895-9.
10. Chinta M, Saisankar AJ, Birra C, Kanumuri PK. Successful management of recurrent mucocele by diode laser and thermoplasticised splint as an adjunctive therapy. Case Reports. 2016 Aug 25;2016:bcr2016216354.
11. Besbes A, Elelmi Y, Khanfir F, Belgacem R, Ghedira H. Recurrent oral mucocele management with diode laser. Case reports in dentistry. 2020;2020(1):8855759.
12. Navya LV, Sabari C, Seema G. Excision of mucocele by using diode laser: a case report. Journal of Scientific Dentistry. 2020 Aug 14;6(2):30-5.
13. Gaikwad TV, Maini AP, Das S, Lokhande S, Patil SK, Sarma A. Nonsurgical management of oral mucocele occurring on a rare site. Contemporary Clinical Dentistry. 2022 Oct 1;13(4):389-91.
14. Besbes A, Elelmi Y, Khanfir F, Belgacem R, Ghedira H. Recurrent oral mucocele management with diode laser. Case reports in dentistry. 2020;2020(1):8855759.

Legend Figures & Tables:

Figure 1: Shows mucocele treated with intralesional injection of 3% polidocanol (A) Before Injection, (B) After injection of 3% polidocanol, (C) After 3 weeks of injection

Figure 2: Shows mucocele treated Diode laser excision (A) Before removal, (B) After excision with Diode laser, (C) After 1 week of excision

Table 1: Distribution of the patients according to age, gender and site of involvement

	Variables	n (%)
Age groups (in years)	1-20	2(15.38)
	21-40	8(61.53)
	Above 41 years	3(23.03)
Gender	Male: Female	11:2
Site of involvement	Lower Lip	12(92.30)
	Buccal Mucosa	1(7.70)

Table 2: Size wise distribution of mucocele along with number of injections required for treatment with follow up

No of cases of mucocele {Size of mucocele}	Cases treated with intralesional injection(n%)	No of injection required to treat mucocele	Post injection complication		
			Pain	swelling	Bleeding
< 1 cm	1(14.28)	2	1	-	-
1-2 cm	6(85.72)	3	1	2	1

Table 3: Size wise distribution of mucocele treated with laser excision with follow up

No of cases of mucocele {Size of mucocele}	Cases treated with laser	Post laser excision complication			
		pain	Bleeding	erythema	Secondary infection
< 1 cm	2(33.33)	-	-	-	-
1-2 cm	4(66.67)	1	-	-	-

Table 4: Recurrence of lesion

Recurrence of lesion	Present	Absent
Treated by intralesional injection	1	6
Treated by diode laser	-	6