

EXCISION OF A SOLITARY MUCOCELE WITH 910NM DIODE LASERDipti Limbekar*¹, Yogesh Doshi² and Mona Shah³

Post Graduate Student of Department of Periodontology Pandit Deendayal Upadhyay Dental College, Kegoan Rd, Solapur-413255, Maharashtra.

***Corresponding Author: Dr. Dipti Limbekar**

Post Graduate Student of Department of Periodontology Pandit Deendayal Upadhyay Dental College, Kegoan Rd, Solapur-413255, Maharashtra.

Article Received on 13/12/2023

Article Revised on 03/01/2024

Article Accepted on 23/01/2024

ABSTRACT

Mucocele are the most common nonmalignant lesions of the oral cavity and are most commonly observed on lower lip. Mucoceles clinically manifests as dome shape fluctuant swelling that is usually painless mainly occurring due to obstruction of minor salivary ducts. Various treatment modalities are available for excision of mucocele. This case report summarizes the application of 910nm diode laser for excision of a solitary mucocele and its beneficial results postoperatively.

KEYWORDS: Mucocele, Marsupialization, Diode laser, Mucus extravasation cysts.**INTRODUCTION**

Mucocele (from the Latin terms mucus, or mucus, and coele, or cavity) are defined as mucus-filled cavities that can appear in the oral cavity, appendix, gallbladder, paranasal sinuses or lacrimal sac they are the most common nonmalignant lesions of the oral mucosa appearing most commonly on the lower lip.^[1]

Clinically there are two types of mucoceles, mucous extravasation and mucous retention. Extravasation mucocele results from a broken salivary gland duct and the consequent spillage into the soft tissues around this gland. Retention mucocele occurs due to a decrease in or absence of glandular secretions produced by blockage of the minor salivary gland ducts.^[2] Treatment procedures for mucocele removal include not only conventional surgical techniques which are most widely performed but also electrosurgery, cryosurgery, micromarsupialization, and marsupialization. Steroid injections were also reported.^[3-4]

Diode laser with wavelengths ranging from 810 to 980 nm in a continuous or pulsed mode was used as a possible modality for soft tissue surgery in the oral cavity. Based on the photothermal effect of the diode laser, the lesions in the oral mucosa can be removed with an excision technique, or by ablation/vaporization procedures.^[5-6]

The application of a diode laser for the removal of mucosal lesions in the oral cavity is a relatively new and viable better alternative to its preceding methods.^[7]

This case report describes the application of 910nm diode laser for the excision of mucocele present on the left side of lower lip. due to its added advantage of less bleeding, improved or reduced healing time, and affinity for melatonin which prevents further or recurrent pigmentation.^[8]

CASE REPORT

A 19-year-old man was reported to the Department of Periodontology with swelling on his left side of the lower lip. The patient was free of any pain; however, he was complaining about the growing swelling and its effect on the overall facial profile of his face. The swelling has been growing in size for the past 3 months and sometimes causes obstruction while biting or chewing. On clinical examination, a swelling of 11mm was found on the lower left lip (Figure 1). Diode laser excision was suggested and patient agreed.

Following minimal infiltration of 1: 1,00,000 lignocaine, the lesion was excised using a soft diode laser with a wavelength of 910 nm, 400 μm diameter tip at 1.5 W in continuous mode. The incision was placed on the uppermost site of the lesion and complete excision was performed (Figure 2,3)

During the procedure there was no bleeding. Since the wound was large it was approximated with 4-0 silk suture (Figure 4, 5). Patient was prescribed analgesics. The biopsy sample was immediately fixed in 10% formalin and sent for histological evaluation. Six-micron-thick sections mounted on glass slides were stained with hematoxylin-eosin (HE). Histological evaluation of the sections by light microscopy revealed

the presence of a granulation tissue lining the mucus cavity surrounded by a condensation of connective tissue rich in inflammatory cells and congested blood vessels. A mucus pool related to foamy cells was observed within the lumen of the lesion. Salivary glands and dilated ducts were also observed at the base of the lesion and in the area of coagulation necrosis (Figure 6,7). With all these

histopathological features a diagnosis of mucous extravasation cyst was given.

Patient was recalled for suture removal after 1 week (Figure 8). An uneventful healing was observed on 15th day and 45th day of follow ups (Figure 9,10).



Figure 1: Preoperative image of the lesion.



Figure 2: Application of 910nm Diode laser.



Figure 3: 11mm Excised Specimen.



Figure 4: Immediate postoperative view.



Figure 5: Suture placed with 4-0 silk.

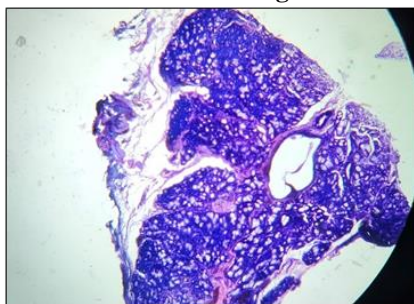


Figure 6: H&E 40x view shows granulation tissue lining the mucus cavity surrounded by a condensation of connective tissue rich in inflammatory cells and congested blood vessels.

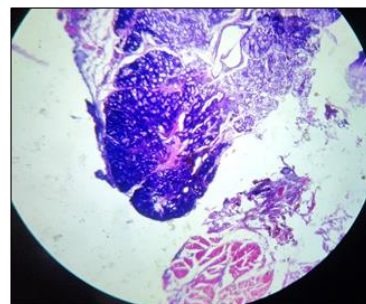


Figure7: H&E 40x view shows areas of coagulation necrosis around the biopsy lesion.



Figure 8: Follow up after 7days.



Figure 9: Follow up after 15 days.



Figure 10: Follow up after 45 days.

DISCUSSION

Mucocele is the second most common lesion in the oral cavity followed by irritational fibroma. This lesion occurs in patients aged between 10 and 29 years with an equal sex distribution.^[9] The lower lip is the most common site for mucoceles, where 60–80% of cases occur. Mucoceles present as soft, smooth, painless swellings, ranging from deep blue to the normal color of the oral mucosa (pink). The deep blue color results from tissue cyanosis and vascular congestion associated with the stretched overlying tissue and the translucent character of the accumulated fluid beneath. A decrease in size may follow rupture of the lesion and subsequent mucin accumulation or reabsorption of saliva deposits. An increase in saliva production can cause the lesion to reform.^[10] Histopathologic examination of mucocele often reveals the formation of well-circumscribed, cyst-like space surrounded by granulation tissue and the presence of mucinophages in the collapsed wall of granulation tissue.^[11]

There are various treatment options available for the early management of mucocele : scalpel incision, complete surgical excision, marsupialization, micro marsupialization, intralesional injections of corticosteroids, cryosurgery, laser ablation, sclerosing agent, and electrocautery methods. The main advantages of soft tissue laser applications are minimal intraoperative bleeding and swelling and postoperative pain and very little surgical time, scarring, and coagulation, without any need for suturing after excision because of natural wound dressing due to denatured proteins.^[12] Diode lasers can be a useful alternative to larger surgical lasers such as Er: YAG and CO₂ lasers. Their small size and low cost are distinct advantages. These devices can provide a well-defined cutting edge, as well as coagulation and hemostasis during excision.^[13]

Absorption of laser energy into the target tissue releases heat by photothermal processes, which further causes intra and extracellular vaporization of cells with resultant cellular explosion and tissue ablation. Adjacent lateral tissues will also absorb heat, after enough time of laser application. This will occur in concentric serial circles around the homogeneous target tissue. Reversible or irreversible damage to areas surrounding the target tissue by the thermal effect of laser results in zone of coagulation necrosis. Delayed healing and a larger wound site may occur on increased time of laser application. On the other hand, sealing of small diameter of vessels rather than the area of coagulation necrosis provides advantages like hemostasis during laser surgery. Area of adjacent coagulation ends with less bleeding at surgical site.^[14]

Histological examination of laser excised tissue shows improved epithelization and lesser inflammation. An intact basement membrane and connective tissue matrix can also be observed. Matrix proteins initiate reparative synthesis on these tissues. Resistance of matrix proteins against laser application and replacement as well as removal of residual matrix is responsible for reduced scarring and contraction.^[15]

CONCLUSION

Application of 910nm diode laser has been found to be the best alternative for surgical excision of mucocele due to its beneficial effects such as minimal anesthesia, less procedural timings, clear surgical site visualization, hemostasis and minimum carbonization in 45 days of periodic follow-up. Laser application in dentistry made it possible to reduce apprehension and fear of surgery in patients.

REFERENCES

1. Baurmash HD. Mucoceles and ranulas. *J Oral Maxillofac Surg*, 2003; 61: 369-78.
2. Boneu-Bonet F, Vidal-Homs E, Maizcurrana-Tornil A, GonzálezLagunas J. Submaxillary gland mucocele: presentation of a case. *Med Oral Patol Oral Cir Bucal*, 2005; 10: 180-4.
3. Ata-Ali J, Carrillo C, Bonet C, Balaguer J, Penarrocha M, Penarrocha M. Oral mucocele: Review of the literature. *J Clin Exp Dent*, 2010; 2: e18-21.
4. Oka M, Nishioka E, Miyachi R, Terashima M, Nishigori C. Case of superficial mucocele of the lower lip. *J Dermatol*, 2007; 34: 754-6.
5. Romanos G, Nentwig GH. Diode laser (980) in oral and maxillofacial surgical procedures: clinical observations based on clinical applications. *J Clin Laser Med Surg*, 1999; 17(5): 193-7.
6. Coluzzi D. Fundamental of lasers in dentistry: Basic science, tissue interaction, and instrumentation. *J Laser Dent.*, 2008; 16: 4-10.
7. Ortega-Concepción D, Cano-Durán JA, Peña-Cardelles JF, Paredes-Rodríguez VM, González-Serrano J, López-Quiles J. The application of diode laser in the treatment of oral soft tissues lesions. A literature review. *J Clin Exp Dent*, 2017; 9: e925-8.
8. Ahad A, Tandon S, Lamba AK, Faraz F, Anand P, Aleem A. Diode laser assisted excision and low-level laser therapy in the management of mucus extravasation cysts: A case series. *J Lasers Med Sci.*, 2017; 8: 155-9.
9. D. Re Cecconi, A. Achilli, M. Tarozzi et al., "Mucoceles of the oral cavity: a large case series (1994–2008) and a literature review," *Medicina Oral, Patología Oral y Cirugía Bucal*, 2010; 15(4): e551–e556.
10. 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.
11. J. Yague-García, A.-J. Espana-Tost, L. Berini-Aytés, and C. Gay- Escoda, "Treatment of oral mucocele-scalpel versus CO2 laser," *Medicina Oral, Patología Oral y Cirugía Bucal*, 2009; 14(9): e469–e474.
12. E. Lee, S. H. Cho, and C. J. Park, "Clinical and immunohistochemical characteristics of mucoceles," *Annals of Dermatology*, 2009; 21(4): 345–351.
13. E. Azma and N. Safavi, "Diode laser application in soft tissue oral surgery," *Journal of Lasers in Medical Sciences*, 2013; 4(4): 206–211.
14. G. A. Catone, C. C. Ailing, and B. M. Smith, "Laser Applications in Oral and Maxillofacial Surgery," *Implant Dentistry*, 1997; 6(3): 238.
15. M. Luomanen, J. H. Meurman, and V. P. Lehto, "Extracellular matrix in healing CO2 laser incision wound," *Journal of Oral Pathology & Medicine*, 1987; 16(6): 322–331.