British Journal of Medicine & Medical Research
10(2): 1-5, 2015, Article no.BJMMR.15245
ISSN: 2231-0614

SCIENCEDOMAIN *international*
www.sciencedomain.org

Diode Laser – A Boon in the Treatment of Mucocele – A Case Report

Shakti Agarwal[1*], Shailesh Kumar[2], Haider Iqbal[1], Kamini Kiran[3], Abhishek Sinha[1] and Rameshwar Singh[4]

[1]Department of Oral Medicine and Radiology, Sardar Patel Post Graduate Institute of Dental and Medical Sciences, India.
[2]Department of Oral and Maxillofacial Surgery, Sardar Patel Post Graduate Institute of Dental and Medical Sciences, India.
[3]Department of Oral and Maxillofacial Pathology, Sardar Patel Post Graduate Institute of Dental and Medical Sciences, India.
[4]Department of Prosthodontics, Dental College Azamgarh, Crown and Bridge and Implantology, India.

Authors' contributions

This work was carried out in collaboration between all authors. Author SA designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author SK managed the literature searches, analyses of the study performed the spectroscopy analysis and author AS managed the experimental process and author KK identified the species of plant. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/BJMMR/2015/15245
Editor(s):
(1) Ibrahim El-Sayed M. El-Hakim, Ain Shams University, Egypt and Riyadh College of Dentistry and Pharmacy, Riyadh, Saudi Arabia.
(2) Emad Tawfik Mahmoud Daif, Professor of Oral and Maxillofacial Surgery, Cairo University, Egypt.
(3) Philippe E. Spiess, Department of Genitourinary Oncology, Moffitt Cancer Center, USA and Department of Urology and Department of Oncologic Sciences (Joint Appointment), College of Medicine, University of South Florida, Tampa, FL, USA.
Reviewers:
(1) Anonymous, Nitte University, India.
(2) Ravisankar Gopakumarapillai, Urology, Royal Bahrain Hospital, Bahrain.
(3) Mahesh Ramakrishnan, Saveetha University, India.
Complete Peer review History: http://sciencedomain.org/review-history/10394

Case Study

Received 15th November 2014
Accepted 16th July 2015
Published 4th August 2015

ABSTRACT

A mucous cyst (mucous extravasation cyst, mucocele, ranula, mucous retention cyst) is a thin sac on the inner surface of the lips. They are painless swellings but can be bothersome. The cysts are thought to be caused because of trauma by sucking of the lip membranes between the teeth, if left untreated; they can organize and form a permanent bump on the inner surface of the lip. They are

**Corresponding author: Email: way2shaq@gmail.com;*

known as ranula when on the floor of the mouth, and epulis when present on the gums. This article highlights the advantages and evaluates the efficacy of treatment of mucocele with the help of diode lasers.

Keywords: Diode laser; extravasation cyst; mucocele.

1. INTRODUCTION

Mucocele is a clinical term which refers to two phenomena: mucous extravasation phenomenon and mucous retention cyst. It occurs due to ruptured salivary gland duct usually caused by local trauma due to which swelling of the connective tissue occurs which consist of mucin [1]. A mucous cyst is a thin sac on the inner surface of the lips which is painless but bothersome. The sac can also occur on the inside of the cheeks, tongue, floor of the mouth, palate or around tongue. There is no known prevention to this, but could be avoided by not sucking the cheeks or lips between the teeth intentionally.

The mucocele has a bluish translucent hue, and seen more commonly in children and young adults. When seen on the floor of the mouth it is referred to as ranula. The size of mucoceles varies from 1 mm to several centimeters and rarely seen on the upper lip. On palpation, mucoceles usually appear fluctuant but can also be firm. The duration of mucocele stays from days to years and recurrent swelling may be seen along with rupturing of its contents. Mucoceles may reoccur in the same location after healing.

Some mucoceles resolve spontaneously by themselves after a short time while others are chronic and require surgical removal. There are several procedures available for the surgical removal of mucoceles amongst those lasers is minimally invasive technique in which recovery time is reduced drastically. A non-surgical procedure can be effective for a small or newly identified mucocele is to rinse the mouth with salt water four to six times a day for a few days. This may draw out the fluid trapped beneath the skin preventing further damage of the surrounding tissue [2].

2. CASE REPORT

A 20 years old male patient reported to Department of Oral Medicine and Radiology in Sardar Patel Post Graduate Institute of Dental and Medical Sciences, Lucknow, U.P India with chief complaint of swelling on the lower lip since 3 to 4 months. The history of present illness consisted of swelling in inner aspect of lower lip in relation to right central incisor region. On examination there was single, well defined round swelling measuring about 0.5 cm in diameter having bluish hue (Fig. 1). On palpation swelling was non tender, soft and fluctuant.

Fig. 1. Mucocele located on the inner aspect of the lower lip

The patient did not have any difficulty in speech. A detailed history derived etiology to be trauma due to lip biting. Routine blood investigations were conducted and values were found to be within normal limits. On the basis of the clinical findings and history of reoccurrence the clinical diagnosis was deduced as a mucocele and patient was advised for excisional biopsy.

The treatment planning consisted of the surgical removal of the lesion with doctorsmile simpler ® 980nm diode laser with maximum power 7W. Patient was asked for complete blood test report and sugar test for preoperative measures. Patient was prepared by infiltrating 2% lignocaine with adrenaline 1:80000 local anesthesia. The Laser was set at 2.0 W power and pulse was in continuous mode duration till the desired depth is obtained fiber used in diode laser was optic fiber and the thickness was 320 micron. 2W power is absolutely safe. Patient, surgeon and assistant wore eye ware to prevent damage to the eyes. The laser was used to first mark out the boundaries by slowly marking out the points with laser beam put in contact with the tissue at intermittent points and then joining the lased points with a continuous beam (Fig. 2). A tissue holding forceps was used to retract the tissue to

one side so as to allow for undermining of the tissue as excisional biopsy was being attempted, this undermining procedure should be done carefully with the tissue retracted to one side and the laser beam kept parallel to the long axis of the tissue so that the beam does not damage the adjacent tissues. Histologically, it was found in the scanner view epithelium overlying the connective tissue is seen. On higher magnification parakeratinised stratified squamous epithelium can be seen, connective tissue stroma shows mucous acini with pooling of mucous (marked by arrow in the Fig. 5), inflammatory cells and extravasated RBCs of mucocele which was suggestive of mucocele. Routine postoperative instruction was given.

Fig. 2. Excision of the lesion using diode laser

Fig. 3. Excised specimen

Fig. 4. Post operative after 7 days

Patient was recalled for regular checkup to evaluate postoperative healing and any reoccurrence of the lesion.

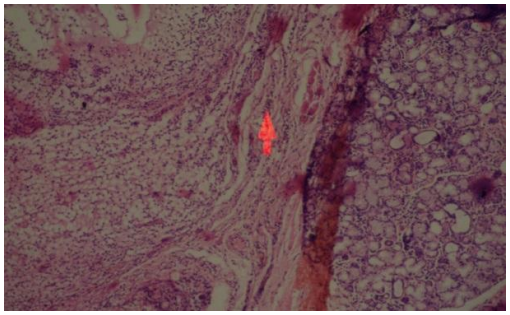

Fig. 5. Histopathological diagram

3. DISCUSSION

Mucoceles may be located either as a fluctuant nodule within the connective tissue or as a fluid filled vesicle in the superficial mucosa [1]. Mucoceles appear as small, discrete, translucent, painless, soft swelling of the mucosa ranging from normal pink to deep blue in color. The development of Mucoceles usually depends on the flow of saliva from the disrupted secretory apparatus of the salivary glands. The lesions are oftenly associated with mucus extravasation into the adjacent soft tissues caused by a trauma to the duct which may include a severance of the excretory duct of the minor salivary gland due to the crush type injury [3]. The lower lip is reported as to be the most common site where the maxillary canine impinges on it [1]. Less common sites are floor of mouth, buccal mucosa, and anterior lateral tongue. In the present case the site of the lesion is right side of the lower lip. The patient may relate a habit of lip biting or a history of trauma. These vesicles rupture and leave ulcerated surface that heals within a few days. Their deep blue color results from vascular congestion and tissue cyanosis associated with the stretched overlying tissue and translucent character of the accumulated mucin beneath. The variation of the color solely depends upon the elasticity of the overlying tissue, size of the lesion and its proximity to the mucosal surface.

In children prevalence of mucous retention phenomenon is low due to inability of ductal structure to contain an excess accumulation of secretion. Since mucocele has high recurrence rate, various treatment approaches have been made like surgical, cryosurgical, intralesional corticosteroids, marsupialization, micro

marsupialization, and lasers [3]. Different kinds of lasers are available with varying wavelength and absorption coefficient, diode lasers especially 980 nm is absorbed by melanin and hemoglobin due to this property it has ability to precisely cut, coagulate, ablate, or vaporize the target soft tissue [4]. Diode lasers are portable units easy to move and handle as they do not have secondary attachments like water supply or air supply needed with bigger units like Er:YAG, Nd:YAG lasers. Lasers causes less trauma and reduced postoperative patient discomfort when compared with conventional methods.

In the present case, diode laser was used for excision of mucocele, the biggest advantage of using laser during surgical procedure there was bloodless field giving better visualization and easy manipulation of the structures being excised. There was also minimal patient discomfort, postoperative pain, and edema. Sutures were not placed in this case as it gives no added advantage to the lased wound as the wound is well covered by tissue created by incomplete combustion by high heat producing diode laser and hence protected from bleeding and from infection. Similar findings were also reported by Sukhtankar LV et al. [1].

Jin et al. [5] reported that diode laser is considered a good cutting device for oral mucosa when compared to other lasers like argon, neodymium: yttrium-aluminum-garnet (Nd:YAG) and carbon dioxide lasers, the diode laser shares similar feature that is intensely absorbed in hemoglobin, results in elevating the temperature and thus promoting coagulation and carbonization of soft tissues, such as the oral mucosa and results in minimum discomfort and scarring [6].

The only negative effect of laser is the slow healing rate of the wound after laser surgery due to decreased collagen formation and decreased epithelization but at the same time there is minimal scarring so that reoccurrence rate is very low which was clearly seen in our case as even after the follow up for $1^{1/2}$ year there was no reoccurrence (Fig. 6).

Histopathological examination showed pooling of mucous in some areas; mucous acini are also present deeper in the connective tissue confirming the diagnosis of mucocele (Fig. 5).

Excision of mucocele using diode lasers seems to be a viable option which permits complete removal of the lesion along with any minor salivary gland involved without interfering with its histopathological examination.

Fig. 6. Complete healing after $1^{1/2}$ years without any complications

4. CONCLUSION

Mucocele is one of the most common soft tissue lesion of oral cavity which is both esthetically unpleasing and functionally irritating.

Although till date conventional surgical method was the treatment of choice but with the invent of diode lasers specifically for soft tissue lesion it has showed marked promising results because of its enumerable advantages like instant sterilization, hemostasis giving bloodless operating field, minimal discomfort to the patient, little wound contraction with minimal swelling and scarring and less operative and post-operative pain therefore increased patients acceptance.

We would like to conclude that diode laser is the newer treatment modality for mucocele, reducing the patient's fear and anxiety.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Sukhtankar LV, Mahajan B, Agarwal P. Treatment of lower lip mucocele with diode laser –A novel approach. Annals of Dental Research. 2013;2(Suppl 1):102-108.
2. Langlais RP, Miller CS. Nodules of the lip. Color Atlas of Common Oral Diseases. 1st ed. Philadelphia: Lippincott Williams and Wilkins. 1992;32.
3. Pedron IG, Galletta VC, Azevedo LH, Correa L. Treatment of mucocele of the lower lip with diode laser in pediatric patients: Presentation of 2 clinical cases. Pediatr Dent. 2010;32:539-41.
4. Pirnat S. Versatility of an 810 nm diode laser in dentistry: An overview. J Laser Health Acad 2007;4:1-8.
5. Jin JY, Lee SH, Yoon HJ. A comparative study of wound healing following incision with a scalpel, diode laser or Er, Cr:YSGG laser in guinea pig oral mucosa: A histological and immunohistochemical analysis. Acta Odontol Scand. 2010;68:232-8.
6. Pandey R, Pathakota KR, Koppolu P, Bolla V. Treatment of mucocele with diode laser. J Dent Lasers. 2013;7:43-6.

Peer-review history:
The peer review history for this paper can be accessed here:
http://sciencedomain.org/review-history/10394