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Treatment of intraoral pyogenic granuloma with diode laser 810-980 nm

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Abstract

Background: Pyogenic granuloma is a hyperplastic benign tumor. The most common intra-oral site is marginal gingiva. It is often occurred in the second decade of life, it has a strong tendency to recur after simple excision.

The aim of study: to evaluate the therapeutic advantages of diode laser (810-980 nm) in intraoral Pyogenic granuloma management.

Materials and method: A total of 28 patients (14 men and 14 females) were enrolled in this study and had their pyogenic granuloma surgically removed using a diode laser. All of the patients were given local anesthetic and went through the identical surgical procedure (cartridge containing 1 percent lidocaine with epinephrine 1:100.000). To achieve hemostasis and minimize bleeding, the lesions were completely eliminated by sweeping the laser fiber tip across the operated site. To allow the wounds to heal, they were not sutured. Then, the specimens sent for histopathology.

Results & Conclusions: In the present study, we noticed that the scale of pain, bleeding and oedema gradually decreased during the first two visits. the measured parameters were completely disappeared after two weeks in most cases as well as the patient satisfaction and function also improved. the Patients were recalled after two weeks, the wounds had completely healed and patients were not complaining any type of discomfort. it is generally believed that poor oral hygiene and poor fitting denture may lead to recurrence. According to obtained results; removal of pyogenic granuloma with diode laser (810-980 nm) is successful, effective and reasonable alternative to conventional scalpel technique.

Keywords: pyogenic granuloma, benign hyperplasia, laser institution, laser surgery, diode laser.

1. Introduction

Pyogenic granuloma is a hemorrhagic mass that occurs mostly on the gingiva (it can occur on any surface) in response to various stimuli. It arises as a result of connective tissue fibrovascular growth (Jensen&Barr,1997). It appears clinically as painless red papules on a sessile or pedunculated base. The size of lesion varies in diameter from a few millimeters to few centimeters (Rai et al., 2011) (Al-Mohaya & Al-Malik,2016). The color of the tumor may differ according to the level of vascularity (Rai et al., 2011). The lesion might be pink, red, or purple in hue. Pyogenic granulomas in their early stages feature increased

vascularity and hyperplastic granulation tissue, but mature PGs have more collagen. To prevent recurrence, the traumatic factors must be reduced (Al-Mohaya & Al-Malik, 2016).

Pyogenic Granulomas were found to occupy 44.4 percent to 83 percent of the oral cavity gum. It has also been found to occur in the buccal, lingual, and palatal mucosa (Eversole, 2001) (Neville et al., 2015). It can be occurred everywhere on the human body, including the nose, lips, fingers, and toes. Pyogenic granuloma can occur at any age; however, it is more common in people between the ages of 10 and 40. It is more common in young adult females in their second decade of life. The vascular impact of female sex hormones could be one of the causes**. (**Esmeili et al., 2005**)** (Adusumilli et al., 2014) (Asnaashari et al., 2014). This study aimed to assess the therapeutic benefits of diode laser (810-980 nm) in the management of pyogenic granuloma.

2. Material and methods

A total of 28 patients (14 men and 14 females) were enrolled in this study and had their pyogenic granuloma surgically removed using the diode laser (810-980 nm).

All the patients complained from the same features which involved intraoral painless red, sessile, or pedunculated smooth surfaced mass that can easily bleed on simple probing; It have been reported that the size of lesions range from 0.5cm to 1.5 cm. The patient consent form was obtained before the surgical operation and the detailing of procedure was elucidated to all patient. Demographical information which include patients age, gender, medical history & clinical examination of the tumor. Preoperative intraoral antisepsis using listerine mouth rinse for roughly 30 seconds was used as part of the treatment plan, and all patients and surgical teams were required to wear safety protective eye glasses. Diode laser 810-980nm, 0.8W power according to the recommended procedure, continuous wave mode (CW) with fiber optic delivery system was used to properly remove the lesions in one piece.

All of the patients received the same surgical technique, and they were all given local anesthetic (cartridge containing 1 percent lidocaine with epinephrine 1:100.000). The lesions were carefully removed by passing the laser fiber tip across the surgical site to achieve coagulation and prevent bleeding. The wounds were not sutured to allow them to heal. After that, the biopsy was preserved in a 10% formaldehyde solution for histological examination. Ciprofloxacin Tab 250mg, Metronidazol Tab 500mg to avoid anaerobic bacterial infection of the exposed tissue, Mefanamic acid Cap. 250 mg were utilized as analgesic drugs as well as listerine mouth wash as treatment regimen, as approved by clinical trial or clinical publication.

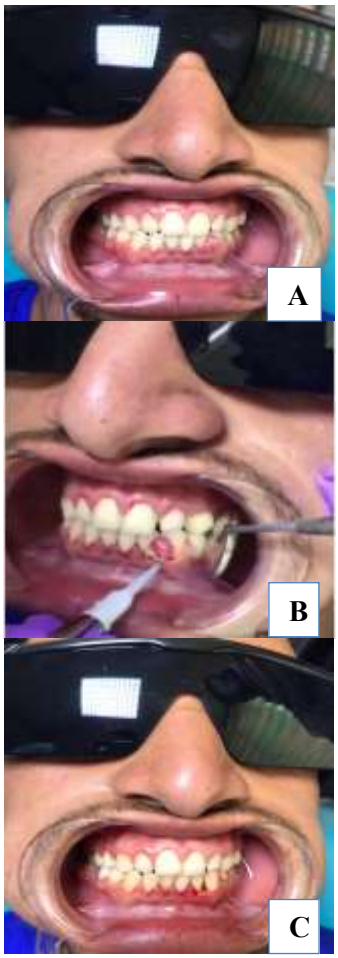

Figure 1: A. Preoperative view B. Application of diode laser C. Postoperative view.

3. Statistical analysis

Data were introduced into SPSS V26 statistical program, tables and graphs were used to present descriptive statistics. While Friedman test was used to measure the improvement in the study dependent

parameters, (Friedman test was used instead of repeated measure ANOVA because the date was not normally distributed) P value< 0.05 was considered as cut-off point of significance.

4. Results

A total of 28 patients (14 females & 14 males) had been enrolled in this study undergone laser excision of pyogenic granuloma by diode laser (810-980nm) aged from 10-45years old. The results of this cross-sectional study show that 28 cases were involved 35.7% of them were in adolescent age while 64.3% were in adult age group, 50% of studied patients were males. Regarding educational level 28.6%, 21.4% and 50% respectively, achieved primary, secondary and university level of education and 35.7% got the disease before less than 3 months.

Table 1: distribution of studied cases according to essential characteristics

		Count	Column N %
Age	<18 year	10	35.7%
	=>18 years	18	64.3%
Gender	Male	14	50.0%
	Female	14	50.0%
Education	Primary	8	28.6%
	Secondary	6	21.4%
	University	14	50.0%
Duration	<3 month	10	35.7%
	=>3month	18	64.3%

Table 2 shows that the level of pain, swelling & bleeding were significantly decreased in median and mean ranks of pain, swelling & bleeding, according to Freidman test, p value ≤ 0.05 in all conditions. Patient satisfaction and function level were found to be steady and significantly increased across different stages of study. P value <0.01 in both conditions.

Table 2: Friedman Test shows differences in pain, swelling, bleeding, patient's satisfaction across different stages of study

		Median	IQR	Mean rank	P VALUE
Pain	1ST	1.00	0.25	3.00	0.001
	2ND	.00	.00	1.57	
	3RD	.00	.00	1.43	
Edema	1ST	1.00	0.25	3.00	0.001
	2ND	.00	.00	1.57	
	3RD	.00	.00	1.43	
Bleeding	1ST	.00	.25	2.21	0.05
	2ND	.00	.00	1.89	
	3RD	.00	.00	1.89	
Satisfaction	1ST	1.00	0.25	1.21	0.001
	2ND	2.00	1	1.96	
	3RD	2.00	1	2.82	
Function	1ST	1.00	1.25	1.18	0.001
	2ND	2.00	1	2.04	
	3RD	2.00	0.25	2.79	

Table 3 shows that Recurrence was noticed in second case when pain, bleeding & swelling were noticed at time of 4th follow up visit, after it has been disappeared at second and third visit just like other 27 patients' lesions, this case was 45 years female employed patient who had primary level of education and she was put poorly fitted denture with multiple manipulation and fitting trials.

5. Discussion

Oral pyogenic granuloma can appear in any decade of a person's life. The majority of the cases were described as a painless mass (Al-Khateeb & Ababneh,2003) (Jafarzadeh et al.,2006) with an ulcerated surface and pedunculated base. in our study, pain, bleeding & swelling completely disappeared in most cases at 2nd visit as well as patient's satisfaction and function also improved at 2nd vis this agree with Roy et al who made it clear that the Patients were recalled after 2 weeks, the lesion had completely healed and patients were not complaining any kind of discomfort (Gupta & Tripathi, 2020).

Table 3: distribution of studied patients according to scores of measured variables according to time of measurements of each patient

	Pain				Edema				Bleeding				Satisfaction				Function			
	R 1	R2	R3	R 4	R1	R2	R3	R 4	R1	R2	R3	R 4	R1	R2	R3	R 4	R1	R2	R3	R 4
1	1	0	0	0	1	0	0	0	0	0	0	0	2	2	3	3	2	2	3	3
2	2	0	0	1	2	0	0	0	1	0	0	1	1	2	2	0	1	2	2	0
3	1	0	0	0	1	0	0	0	0	0	0	0	2	2	3	3	2	2	3	3
4	1	0	0	0	1	0	0	0	0	0	0	0	1	2	3	3	1	2	3	3
5	2	1	0	0	2	1	0	0	1	0	0	0	1	1	2	2	0	1	2	2
6	2	1	0	0	2	1	0	0	1	0	0	0	1	1	2	2	0	1	2	2
7	1	0	0	0	1	0	0	0	0	0	0	0	1	2	2	3	1	2	2	3
8	1	0	0	0	1	0	0	0	0	0	0	0	2	2	3	3	1	2	2	3
9	1	0	0	0	1	0	0	0	0	0	0	0	1	2	2	3	2	1	2	3
10	1	0	0	0	1	0	0	0	0	0	0	0	1	1	2	3	0	1	2	3
11	1	0	0	0	1	0	0	0	0	0	0	0	0	1	2	3	0	1	2	3
12	1	0	0	0	1	0	0	0	0	0	0	0	1	2	2	3	1	2	2	3
13	1	0	0	0	1	0	0	0	0	0	0	0	1	2	2	3	1	2	2	3
14	2	1	0	0	2	1	0	0	1	0	0	0	1	1	2	2	0	1	2	2
15	1	0	0	0	1	0	0	0	0	0	0	0	1	2	2	3	1	2	2	3
16	1	0	0	0	1	0	0	0	0	0	0	0	2	2	3	3	1	2	2	3
17	1	0	0	0	1	0	0	0	0	0	0	0	1	2	2	3	2	1	2	3
18	1	0	0	0	1	0	0	0	0	0	0	0	1	1	2	3	0	1	2	3
19	1	0	0	0	1	0	0	0	0	0	0	0	0	1	2	3	0	1	2	3
20	1	0	0	0	1	0	0	0	0	0	0	0	1	2	2	3	1	2	2	3
21	1	0	0	0	1	0	0	0	0	0	0	0	1	2	2	3	1	2	2	3
22	1	0	0	0	1	0	0	0	0	0	0	0	1	2	3	4	2	2	3	3
23	1	0	0	0	1	0	0	0	0	0	0	0	2	2	3	3	2	2	3	3
24	1	0	0	0	1	0	0	0	0	0	0	0	1	2	3	3	1	2	3	3
25	2	1	0	0	2	1	0	0	1	0	0	0	1	1	2	2	0	1	2	2
26	1	0	0	0	1	0	0	0	0	0	0	0	1	2	3	3	1	2	3	3
27	2	1	0	0	2	1	0	0	1	0	0	0	1	1	2	2	0	1	2	2
28	1	0	0	0	1	0	0	0	0	0	0	0	0	1	2	3	0	1	2	3

R1=3 days post op, R2= 1 week postop, R3=2 week postop.,R4=4 week postop.

One case only undergo recurrence due to poor oral care and poor fitting partial denture.

Oral pyogenic granuloma with Short duration much more easily bleed due to less collagen fibers as well as high vascularity; in contrast the older one has more collagen and less vascularity (Gordon et al., 2010) (Debadutta, 2020). The socioeconomic status & oral hygiene practice for the patient play an important role in the growth of the tumor. In our investigation, the tumors of oral pyogenic granuloma varied in size from (0.5 – 2.5) cm in diameter. Simple surgical excision of the oral pyogenic granuloma with a diode laser 810-980 nm bonded to the lesion base, including about approximately (2 mm) of the surrounding healthy tissue. In order to avoid recurrence, it is critical to follow up on treated patients. Because recurrence was caused by insufficient lesion removal as well as the persistence of causative variables (Kamran et al., 2006) (Ujwala et al., 2018) (Wasan et al., 2020). 2 mm of the surrounding normal healthy tissue was ablated after removing the irritating factors (i.e. low-grade trauma, poor oral hygiene, overhanging restoration & prolonged local irritation) in order to have a good prognosis.

Histopathological analysis of the excised oral pyogenic granulomas revealed inflammatory cells and macrophages infiltrating the vascular granulation tissue , i.e distinguished vascular growth suggesting angiogenesis of a strong performance which may develop with any age but are mostly seen in adolescents and young adults (Papageorge & Doku, 1992) (Kamran et al., 2006) (Marla et al., 2016) (Rossa et al., 2017) (Rugma et al., 2020).This study showed no radiographical sign of bone resorption associated with tumor growth.

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معالجة الورم الحبيبي الليفي الفموي باستخدام دايود ليزر ثنائي الطول الموجي 980نانومتر و 810 نانو متر

اية عبدالكريم مجيد تحرير نزال الدليمي

جامعة بغداد / معهد الليزر للدراسات العليا

الخلاصة

الخلفية والمعلومات: الورم الحبيبي القيحي (PG) هو ورم حميد مفرط التنسج ، يقع غالبا داخل الفم مكان اللثة الحدية ، وغالبًا ما يحدث في العقد الثاني من العمر ، وله ميل قوي للتكرار بعد الاستئصال البسيط.
الهدف من الدراسة: تقييم المزايا العلاجية لليزرالصمام الثنائي 810-980 nm في علاج الورم الحبيبي القيحي داخل الفم.
المواد والطريقة: تم تسجيل ما مجموعه 28 مريضًا (14 رجلاً و 14 أنثى) في هذه الدراسة وتم إزالة الورم الحبيبي القيحي جراحيًا باستخدام ليزر ديود. خضع جميع المرضى لتخدير موضعي وخضعوا لعملية جراحية مماثلة (خرطوشة تحتوي على 1 بالمائة ليدوكائين مع إبينيفرين 1: 100.000). لتحقيق الإرقاء وتقليل النزيف ، تم القضاء على الآفات تمامًا عن طريق مسح طرف ألياف الليزر عبر موقع العملية. للسماح للجروح بالشفاء، لم يتم خياطتها. ثم أرسلت العينات للتشريح النسيجي المرضي.
النتائج والاستنتاجات: في الدراسة الحالية ، لاحظنا أن حجم الألم والنزيف والوذمة انخفض تدريجياً خلال أول زيارتين. اختفت العلامات التي تم قياسها تمامًا بعد أسبوعين في معظم الحالات ، كما تحسّن أيضًا رضا المريض والاداء الوظيفي. تم استدعاء المرضى بعد أسبوعين ، وقد التئمت الجروح تمامًا ولم يشكو المرضى من أي نوع من الانزعاج. من المعتقد بشكل عام أن بيئة الفم السيئة وسوء تركيب طقم الأسنان قد يؤدي إلى تكرار الإصابة. وفقا للنتائج التي تم الحصول عليها ؛ إزالة الورم الحبيبي القيحي باستخدام ليزر دايود ثنائي الطول الموجي 810-980 nm هو بديل ناجح وفعال ومعقول لتقنية المبضع التقليدية (الطريقة الجراحية).