

Excision of Traumatic Fibroma By Electrocautery And Diode Laser: Case Reports

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Abstract

Traumatic or irritation fibroma is a benign tumour of connective tissue origin. In the oral cavity, they occur in response to irritation from local trauma, and the most common sites are buccal mucosa and tongue. The management of this reactive lesion can be done through conservative surgical approach using scalpel, electrocautery or laser. This case report aims to evaluate the wound healing and postoperative pain, after surgical excision of Traumatic fibroma using electrocautery versus diode laser. The diode laser has become the “soft tissue hand piece” in many dental offices. Evidence suggests that lasers can have a biostimulatory effect on tissue, which in

turn can reduce postoperative discomfort, improve healing and shorten healing times.

Keywords: Traumatic fibroma, Electrocautery, Diode laser, Wound evaluation scale, Visual analogue score

Introduction

Gingival overgrowth is one of the most frequently encountered lesion of oral cavity, which arises as a result of irritants such as trauma, microorganisms, plaque, calculi, overhanging margins, restorations, foreign bodies, chronic biting, margins of caries, sharp spicules of bones and overextended borders of appliances. Traumatic or irritation fibroma is the healed end product of the inflammatory hyperplastic lesion [1].

Fibromas arise from the gingival connective tissue or from the periodontal ligament. They are slow-growing, spherical tumours that tend to be firm and nodular but that may be soft and vascular and are usually pedunculated. Hard fibromas of the gingiva are rare; most of the lesions that are diagnosed clinically as fibromas are inflammatory enlargements. Histopathologic review of fibromas demonstrates bundles of well-formed collagen fibres with scattered fibrocytes and various degrees of vascularity [2]. Traumatic or irritation fibroma is a benign tumour of connective tissue origin [3]. Inflammatory hyperplasia” or **traumatic fibroma** is a term, which can be described as nodular exophytic growths that is presented as granulation tissue fibrous in nature [4]. In the oral cavity, they occur in response to irritation from local trauma, and the most common sites are buccal mucosa and tongue. Their size usually ranges from 0.5 cm to 1.5 cm and are asymptomatic, dome shaped, smooth surfaced, sessile or pedunculated masses that usually occur in females between 20-50 years.

The recurrence rate is very low, but when it occurs, it may be due to the persistence of offending irritant [3]. The management of this reactive lesion can be done through conservative surgical approach using scalpel, electrocautery or laser. It shows no malignancy and recurrence if surgical **excision** is done [4].

Wound healing monitoring is an important concern in all surgical procedures since it allows to identify signs or/and symptoms possibly related to surgical complications [5].

The healing process is slower in open wounds due to delayed epithelial closure and a higher rate of granulation tissue formation (Cohen et al., 1992; Vanwijck, 2001; Sorensen, 2012; Glim et al., 2013; Karamanos et al., 2015). Extracellular matrix formation is initiated at the wound edge, and gradually progresses to the centre /core of the wound. The final stage of the wound healing

process is called the contraction phase, which begins following sufficient collagen formation in the granular tissue. The remodelling process, in which fibroblasts are degraded and matrix production stops, follows wound contraction (Cohen et al., 1992; Broughton et al., 2006; Ozturk and Ermertcan, 2011) [5].

Numerous advanced technologies such as lasers and electro surgery units have been developed to provide haemostasis, comfort to the patient, ease of use and enhanced wound healing [6].

Thus, this case reports aims to compare and evaluate the wound healing and postoperative pain associated with the surgical excision of traumatic fibroma using electrocautery versus diode laser.

Case Reports

Case 1: A 30-year-old male patient reported to Department of Periodontology, RajaRajeswari Dental College and Hospital, with the chief complaint of growth in lower lip on left side of the angle of mouth since last four months. A detailed case history revealed a systemically healthy male with no significant dental history. The lesion was first noticed 3 months ago, which was smaller in size initially and has increased gradually to the present size. The growth has interfered in chewing and normal functioning of the mouth.

Intraoral examination revealed, a solitary, sessile, well circumscribed mass with smooth surface, painless on digital pressure. Firm in consistency, and lobulated pink swelling measuring 5×5 mm in its greatest diameter in relation to tooth number 34 and 35 on lower lip on left side of the angle of mouth along the occlusal plane of maxillary and mandibular teeth (Figure 1, 2a and 2b). Clinical examination also indicated a sharp buccal cusp in relation to tooth number 34, 35 that was identified as the source of irritation.

Surgical procedure

The patient was explained regarding the treatment procedure and an informed consent was obtained for the same. The patient underwent oral prophylaxis and was instructed to perform and maintain oral hygiene practices. Coronoplasty and occlusal adjustments were carried out in relation to tooth number 34 and 35.

After haematological investigation, excisional biopsy was performed intra orally (Figure 3) under local anaesthesia using electro cautery (Art- E1 110V Electrosurgery Dental Vet cutting unit). Cutting and coagulation mode was used for excision. Single wire electrode was used for excision whereas a ball electrode was used for coagulation. Light brushing strokes were used and the tip was kept moving all the time. Prolonged and repeated application of electrode to the tissue was avoided as it could induce heat accumulation and may cause undesired tissue destruction. Following fibrous tissue excision (Figure 4), immediate postoperative haemostasis was achieved (Figure 5).



Fig 3: Excisional biopsy done using electrocautery



Fig 4: Excised tissue



Fig 1: Preoperative photograph



Fig 5: Immediate postoperative photograph



Fig 2a, 2b: swelling measuring 5x5 mm



Fig 6: Post 1-week follow up

Post-operative evaluation: post-operative evaluation was done at 24hours, 72hours and 1 week, and it was found to be uneventful. Wound healing was assessed through Wound evaluation score (WES) and patient compliance was assessed through Visual analogue Score (VAS).

Wound healing assessment: A score of 5 was observed at 1 week postoperatively. A scoring of ≤ 5 at 1-week post operatively indicates sub-optimal healing. Overall, cosmetic appearance was well, but with slight irregularities in the contour.

VAS score: The patient's postoperative self-assessment report with VAS showed a VAS score of 2 at 24 hours followed by score 0 at 72 hours and 1week post operatively indicating that the patient experienced slight pain at 24 hours and absolutely no pain at 72hours and 1-week post operatively.

Case 2: A 25-year-old female patient reported to the Department of Periodontology, RajaRajeswari Dental College and Hospital, with a chief complaint of growth on right side of the tongue from 3 months. A detailed case history revealed a systemically healthy female with no significant dental history. The lesion was first noticed 2 months ago, which was smaller initially and has increased gradually to the present size. The growth has interfered in chewing and normal functioning of the mouth.

Intraoral examination revealed, a solitary, sessile, well-circumscribed mass with smooth surface, painless on digital pressure. Firm in consistency, and lobulated pink swelling measuring 8×4 mm in its greatest diameter in relation to tooth number 46 and 47 on right lateral border of tongue along the occlusal plane of maxillary and mandibular teeth (Figure 7 and 8). Clinical examination also indicated a sharp mesiolingual cusp in relation to tooth number 46, which was identified as the source of irritation.



Fig 7 And 8: Preoperative photograph

Surgical procedure

The patient underwent oral prophylaxis and was instructed to perform and maintain oral hygiene practices. Coronoplasty and occlusal adjustments were carried out irt 46. The haematological investigation revealed normal findings. After 1 week, patient consent was obtained and intervention was carried out using a conservative surgical excision using diode laser (Sirona Xtend 980nm Diode laser) at 3W in a continuous mode under strict aseptic condition, after the administration of local anaesthesia (Figure 9).

Following fibrous tissue excision (Figure 10), immediate postoperative haemostasis was achieved (Figure 11).

Post-operative evaluation: post-operative evaluation was done at 24hours, 72hours and 1 week, and it was found to be uneventful.

Wound healing assessment: A score of 6 was observed at 1 week postoperatively which indicates optimal wound healing.

VAS score: Patient reported VAS score of 0 at 24hours, 72hours and 1 week post operatively indicating no pain experience at 24hours, 72hours and 1-week post operatively.



Fig 9: Excisional biopsy done using Diode LASER



Fig 12: Post 1-week follow up



Fig 10: Excised tissue

Histopathology: The Haematoxylin & Eosin stained sections were examined under light microscope with a resolution of 20x showed, stratified squamous epithelium in both cases. The connective tissue shows numerous capillaries and endothelial cell proliferation, which is suggestive of “Irritational /Traumatic fibroma (Figure 13, 14).

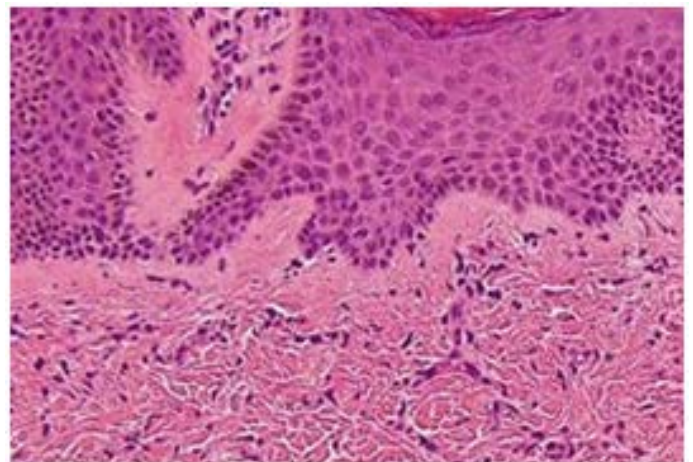


Fig 13: Histopathological Section of Case 1



Fig 11: Immediate postoperative photograph

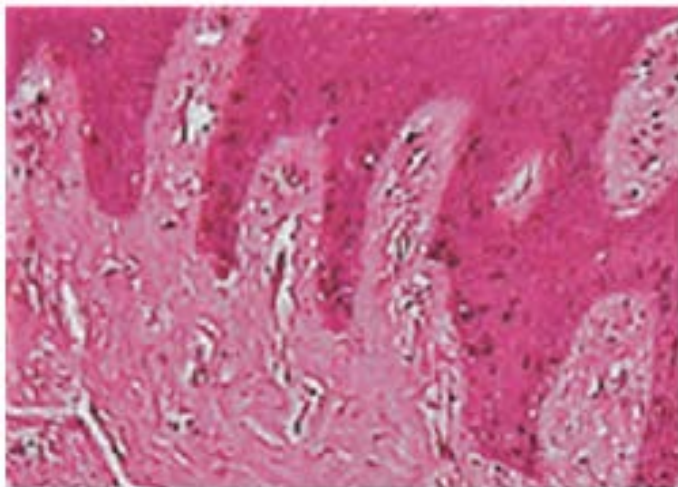


Fig 14: Histopathological Section of Case 2

Discussion

Traumatic fibroma being the most common benign soft tissue tumour is the outcome of a chronic repair process that includes granulation tissue and scar formation resulting in a fibrous sub mucosal mass. Different kinds of treatment include scalpel excision, electrical surgery, and laser excision. Few of the complications associated with conventional scalpel surgery are intra and postoperative bleeding, impaired wound healing, swelling, scarring, and postsurgical pain [4]. Hence, to achieve haemostasis, to increased visibility, ease of use and to provide comfort to the patient, various advanced technologies were developed.

The oral cavity is a remarkable environment in which wound healing occurs in warm oral fluid containing millions of microorganisms. Wound healing requires multiple finely tuned processes that occur in a specific sequence (Bielefeld et al., 2013; Eming et al., 2014). Clinical use of instruments that coagulate vessels as they incise, such as lasers and electrosurgery units helps in faster wound healing with better patient compliance [6].

Wound healing was assessed through Wound evaluation scale (Hollander) and was recorded on the 7th postoperative day. It addresses 6 clinical variables, each one with a 1/0 (not present/present) score for a maximum

total score of 6: step-off borders, contour irregularities (puckering), wound margin separation greater than 2 mm, edge inversion (sinking, curling), inflammation (redness, discharge), and overall cosmetic appearance (well/not well). A scoring of 6/6 indicates optimal wound healing whereas a score of ≤ 5 indicates sub-optimal healing [7, 8]. WES is useful to assesses various clinical variables when determining an optimal v/s a suboptimal scar. Monitoring of wound treatment through WES may provide insight into improved treatment strategies for traumatic wounds.

In this case reports, the first case was treated with electrocautery which showed a WES score of 5 suggestive of irregular contours (5/6- sub-optimal healing), whereas in the second case that was treated with laser, had a total score of 6/6, which indicated optimal healing.

This shows that the laser treated case showed better post-operative healing parameters when compared to electrocautery. However, statistically there was no significance to be mentioned about when post-operative wound healing was measured at 1 week.

When pain perception was compared post-operatively with VAS, no pain was observed in the case treated with Laser with score of 0 at 24hour, 72hour and 1-week post operatively. The case treated with electrocautery reported with a VAS score of 2 at 24hour followed by score 0 at 72hour and 1 week post operatively.

Quinn et al. found that Wound evaluation scale and Visual analogue score should be used together since it is reliable and sensitive in detecting clinically important outcome measures for wound healing [8].

The observation of the current case series is in accordance with that of other reports by Kumar et al, which have used diode lasers to treat periodontal defects. They concluded that no statistical difference was found between the laser and the cautery group at 24 hour, but at 72 hour healing was better in Laser side. At 1 week and 2 weeks

postoperatively, equivalent healing was observed on both laser side and electrocautery side [9].

Romanos and Nentwig used diode lasers in a variety of oral soft tissue surgeries and observed numerous intraoperative and postoperative clinical advantages including sufficient hemostasis, precise incision margin, lack of swelling, bleeding, pain or, scar tissue formation, and good wound healing. They recommended diode laser as an alternative solution to conventional electrosurgery and scalpel [10].

Electrosurgery has been used since 1928 in dentistry because of its advantage of coagulative effect. However, due to various disadvantages like, unavoidable burning flesh odour, low tactile sense, bone necrosis if used in vicinity to bone, contraindication in patients with poorly shielded pacemakers, poor postoperative healing in patients who have undergone irradiation, diabetes or blood dyscrasias makes it an inferior choice for its use in surgical excision [8, 11]. It does not have the ability to be used routinely without local anesthetic and does not possess the same ability to provide bacterial depletion as lasers do [12]. Laser is efficient and effective in soft tissue removal showing excellent haemostasis, reduced postoperative pain, reduced swelling and discomfort and better wound healing [13].

The beneficial effect of laser includes photo bio modulation (PBM). It results in therapeutic benefits, such as alleviation of pain or inflammation, immunomodulation and promotion of wound healing, and tissue regeneration. PBM is a nonthermal process involving endogenous chromophores that elicit photo physical (linear and nonlinear effects) and photochemical events at various length scales, resulting in beneficial photo biological responses [14].

Lasers have a biostimulatory effect on tissue, which in turn can reduce postoperative discomfort, improve healing

and shorten healing times. The excellent antibacterial capabilities make lasers effective and desirable in many areas in the oral cavity where the risk of postoperative infection may be reduced. The diode laser has become the “soft tissue handpiece” in many dental offices. The advantages of being able to work around metals including dental implants, a reduced need for anesthetic, and a reduced risk of recession postoperatively, the ability to reduce bacteria and to use the diode to photocoagulate vascular lesions have all provided dentists with a new alternative for soft tissue surgery. Lasers have two added benefits in that they do not require a pad to be placed under the patient for grounding, and they can be used safely with pacemakers [12].

Also, laser can induce the activity of fibroblasts and osteoblasts by the activation of pathways associated with BMP-2 signalling increases the production of collagen during the healing phase [15].

Asnaashari M et al., examined histologically in their study and found that laser wounds have been found to contain a significantly lower number of myofibroblasts. This results in less wound contracture or scarring, and ultimately improved healing. Because of improved healing and hemostasis, intraoral laser wounds can often be left without sutures, results in healing by secondary intention. Less postoperative swelling and pain is another advantage of lasers, which most likely correlates with decreased tissue trauma, and an alteration of neural transmission [16].

In 2008, Dr. Gordon Christensen compared the soft tissue cutting abilities of diode lasers to those of electrosurgery (radiosurgery) units and found that diode lasers were able to be used around metal (amalgam and gold) as well as with dental implants. He stated that lasers did not harm dental hard tissues (bone) or soft tissues (pulp), and that the clinician could use the laser with less anesthetic, and

finally he mentioned that lasers were antimicrobial (antibacterial) [12].

Many international studies have shown further advantages of laser surgery compared to conventional surgery, such as lowering of the pain level, an almost bleeding-free operation field, as well as low incidence of postoperative haemorrhage, all of which reduce psychological load for both the patient and the surgeon [16].

Conclusion

To the best of author's knowledge, this is the first case report, which compares wound healing and VAS scores of surgically excised traumatic fibroma using 2 different methods i.e, laser and electrocautery. Excision with diode laser was observed as advantageous over electrocautery with no post-operative pain.

Limitations

- A small sample size is not sufficient to fully, understand the pros and cons of any device or to compare superiority or inferiority of one over another.
- The results were subjective.
- Site and size of lesion variation, difference in turnover rate of tongue and mucosa are some of the other limitations.

Abbreviations

BMP-2- Bone morphogenetic protein

PBM- Photo bio modulation

VAS- Visual analogue Score

WES- Wound evaluation score.

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