



## LASER ASSISTED PERIODONTAL FLAP vs CONVENTIONAL FLAP – A CASE REPORT

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### ABSTRACT

**Background** - The use of lasers has been proposed as an adjunctive method for surgical periodontal therapy. The aim of the present study was to compare diode laser assisted periodontal flap with conventional periodontal flap in the surgical treatment of chronic periodontitis.

**Material and method**- A 30 year male patient with chronic periodontitis was treated with diode laser assisted periodontal flap in one of the maxillary quadrant and conventional periodontal flap on the contralateral side. Gingival index (GI), probing pocket depth (PPD) and relative attachment level (RAL) were recorded at baseline, 6 weeks and 3 months post-operatively.

**Results**- Significant improvement in all parameters (GI, PPD, RAL) was seen on both the sides with slightly better results with the laser assisted periodontal flap surgery.

**Conclusion**- Diode lasers can be used as an adjunct to conventional periodontal flap.

**KEYWORDS** : Diode Laser, Conventional Flap, Chronic Periodontitis, Laser Therapy, Gingiva.

### INTRODUCTION

The time has come to embrace the routine use of lasers for the treatment of periodontal diseases. Laser assisted periodontal therapy (LAPT) is the trend nowadays which is used as an adjunct to our conventional periodontal therapy to improve the outcomes.<sup>1</sup> The lasers could be used specifically for hard tissue applications (eg. Er:YAG and ErCr:YSGG) or for the soft tissue treatment (eg. CO<sub>2</sub>, Nd:YAG, and diode lasers).<sup>2</sup>

Diode laser comes with a flexible fiberoptic system which works at a wavelength of 635-950nm in a gated or continuous pulse mode. It is well absorbed by melanin, haemoglobin, and other chromophores that are present in periodontal tissue.<sup>2,3</sup> The diode specifically targets unhealthy gingival tissues. The laser energy is transmitted through a thin fibre that can easily penetrate into deep periodontal pockets to deliver its therapeutic effects. Also, Haypek (2006) reported the use of diode laser for root surface conditioning as thermally safe.<sup>4</sup>

The purported advantages of laser vs scalpel includes increased coagulation that yields a dry surgical field and better visualization, the ability to negotiate curvatures and folds within tissue contours, tissue surface sterilization, and therefore reduction in bacteremia, decreased swelling, edema and scarring, decreased pain, faster healing response and increased patient acceptance.<sup>5</sup>

Considering the above facts, a comparative analysis of a diode laser assisted periodontal flap with conventional periodontal flap was carried out in the surgical treatment of chronic periodontitis.

### CASE REPORT

A 30 year old male patient suffering from generalized chronic periodontitis was selected from the outpatient department of Guru Nanak Dev Dental College & Research Institute, Sunam. Phase I therapy was initiated with the patient exhibiting good tissue response to the therapy. Although there was maintenance of satisfactory oral hygiene, residual pockets of  $\geq 4$  mm remained. Therefore, a surgical approach was planned and discussed with the patient. Maxillary right quadrant was selected for the laser assisted periodontal flap (test) and maxillary left quadrant was selected for the conventional periodontal flap (control). The informed consent of the patient was taken. Clinical parameters including gingival index (Loe and silness, 1963), probing pocket depth (PPD) and relative attachment level (RAL) were recorded at baseline, 6 weeks and 3 months post-operatively.

### SURGICAL PROTOCOL

After a pre-surgical rinse with chlorhexidine gluconate (0.2%) for one minute, local anesthesia was administered.

On the test side, a diode laser of 940 nm wavelength (epic™, Biolase Technology Inc.) and a power setting of 2W was used in continuous, contact mode with the help of a flexible fiberoptic delivery system (tip code: E3-9, length 9mm, diameter 1.1mm). After crevicular incision, a full mouth thickness flap was reflected. A thorough mechanical debridement and removal of granulation tissue was done. This was followed by application of fiberoptic tip of laser which was directed parallel to the root surface and was used in light contact with a sweeping action on the undersurface of the flap covering the entire epithelium lining. The fiber tip was cleaned often with a damp gauze to prevent the build up of debris.

On the control side, conventional access flap surgery with mechanical debridement was performed. The surgical sites were sutured and routine postoperative instructions were given to the patient.

### RESULTS

The mean and standard deviation values of the three clinical parameters (GI, PPD and RAL) on both test and control sides at baseline, 6 weeks and 3 months were analysed using descriptive statistics. The results are presented in the table no. 1.

The values of gingival index (GI) in the test were  $1.40 \pm 0.50$ ,  $0.66 \pm 2.14$  and  $0.26 \pm 0.45$  and in the control were  $1.00$ ,  $0.14 \pm 0.35$  and  $0.37 \pm 0.49$  at baseline, 6 weeks and 3 months post-operatively.

The probing pocket depth (PPD) recorded was  $4.07 \pm 2.09$  at baseline,  $3 \pm 2.14$  at 6 weeks and  $2.33 \pm 1.59$  at 3 months in the test side, whereas it was  $3.14 \pm 1.48$  at baseline,  $2.25 \pm 1.34$  at 6 weeks and  $2.03 \pm 1.34$  at 3 months in the control side post-operatively.

Both GI and PPD scores showed significant reduction in both sides, with slightly better results on the test (Laser) side.

At baseline, relative attachment level (RAL) on the test side was  $7.84 \pm 0.55$ , at 6 weeks was  $7.07 \pm 0.64$  and at 3 months was  $6.00$ , whereas on the control side, RAL score was  $6.53 \pm 1.05$  at baseline,  $5.30 \pm 2.05$  at 6 weeks and  $5.38 \pm 1.04$  at 3 months post-operatively.

### DISCUSSION

In the present study, diode laser (epic™) which works at a wavelength of 940 nm was used as an adjunct to our conventional periodontal flap surgery. Significant improvement with all the gingival health parameters (i.e. GI, PPD, RAL) was observed with addition of diode laser. Also, decreased gingival bleeding, decreased inflammation and pocket depth and decreased clinical attachment loss was seen. The improvement in gingival health was found to be more stable in laser assisted periodontal flap than with the conventional periodontal flap alone and tends to last longer.

Moreover, patient comfort was significantly enhanced during the post-operative healing phase, with the addition of diode laser therapy.<sup>6</sup> The results obtained in this study are in accordance with those reported by Katuri KK et. al,<sup>7</sup> Philstrom BL et. al. (1984)<sup>8</sup>, Gaspric B et. al. (2007)<sup>9</sup>, Qadri T et. al. (2010)<sup>10</sup> and Salaria SK et. al.(2013)<sup>11</sup>. Also, Abu Elsaad NS et. al. in 2009 reported significant improvement in PPD and RAL in treatment of periodontal osseous defects when diode laser was used as an adjunct in comparison to use of bioactive glass alone.<sup>12</sup>

CONCLUSION

Diode laser is a tool of modern dentistry and has proven to be a useful adjunct to our conventional periodontal flap surgery. In lieu of advantages offered, it provides an excellent means of keeping periodontal treatment in general practice.

TABLES

TABLE 1 – Mean and standard deviation values for GI, PPD and RAL on both sides			
		Test (Laser Assisted Periodontal Flap)	Control (Conventional Periodontal Flap)
Gingival Index (GI)	Baseline	1.40 ± 0.50	1.00
	6 weeks	0.66 ± 2.14	0.14 ± 0.35
	3 months	0.26 ± 0.45	0.37 ± 0.49
Probing Pocket Depth (PPD)	Baseline	4.07 ± 2.09	3.14 ± 1.48
	6 weeks	3.0 ± 2.14	2.25 ± 1.34
	3 months	2.33 ± 1.59	2.03 ± 1.34
Relative Attachment Level (RAL)	Baseline	7.84 ±0.55	6.53 ± 1.05
	6 weeks	7.07 ± 0.64	5.30 ± 2.05
	3 months	6.00	5.38 ± 1.04

FIGURE LEGENDS



FIGURE 1 – Preoperative view



FIGURE 2 – Laser application

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