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Management of Gingival Enlargement during Orthodontic Treatment by Diode Lasers versus Conventional Method

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Abstract

Objective: The aim of this study was to assess the efficacy of diode lasers (810-980 nm) in treating gingival enlargement caused by orthodontic appliances. Additionally, to compare the outcomes of diode laser treatment with the conventional method (scalpel) in managing gingival enlargement.
Materials and Methods: For this study, a total of 20 patients ranging in age from 14 to 28 years old were included. These individuals were divided into two groups: the laser group and the conventional group. In the laser group, surgery was performed on 10 patients using an 810–980 nm diode laser in continuous wave mode with energy settings of 1.5–2 watts. On the other hand, the conventional group also consisted of 10 patients who underwent gingival enlargement management due to an orthodontic appliance using a scalpel. To assess pain and discomfort, patients were provided with a questionnaire to record their experiences daily for the first seven days following the surgery. Pain and discomfort were evaluated using a verbal rating scale. During follow-up visits, plaque index, bleeding on probing, healing, and swelling were assessed. Additionally, the duration of the surgery and bleeding scores were recorded during the surgical procedure.
Results: The initial postoperative bleeding score was significantly lower in the laser group compared to the conventional group. The duration of the procedure was shorter in the laser group than in the conventional group. Additionally, the laser group exhibited lower levels of PI and BOP percentages compared to the conventional group. Notably, there was a significant different in the percentage of BOP, with a P=0.03 in the first week, and a P=0.002 in the fourth week, as determined by T-tests. When comparing individuals in the laser group to those in the conventional group, it was observed that the pain and discomfort scores decreased.
Furthermore, the swelling score was significantly lower in the laser group compared to the conventional group, particularly in the third week (Chi square statistic = 4.9, P=0.05). Lastly, there was a significant variation in healing scores in the laser group throughout all weeks of follow-up, as indicated by the T-test (P< 0.05).
Conclusion: Based on the results obtained, it can be concluded that diode lasers operating within the range of 810-980 nm, when set at the appropriate power level, prove to be an effective method for managing gingival enlargement caused by orthodontic appliances

Keywords: Gingival Enlargement, Diode Lasers, Scalpel, Gingivectomy.

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Introduction

Gingival enlargement is one of the most common soft tissue diseases related to fixed orthodontic equipment [1,2]. In addition to causing functional and aesthetic problems, gingival enlargement has been shown to interfere with orthodontic tooth movement and make it more difficult to maintain good dental hygiene, which in turn damages the periodontium more significantly [3].

With more individuals seeking orthodontic treatment, there is a greater risk of iatrogenic periodontal damage, which presents an ongoing challenge for orthodontists in maintaining a healthy periodontal condition for their patients [4].

The tested metal devices (brackets) showed a high affinity for bacteria and proteins. There were also differences in the adsorption profiles between the elastic devices. Therefore, it is conceivable that different types of biofilms would form on these

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orthodontic surfaces, as they are made of different materials and have different elasticity and morphology [5].

The management of gingival enlargement is contingent upon the cause and underlying pathology. The strategy employed is contingent upon the type of enlargement and is guided by the clinical and pathological manifestations. Before any surgical measures are taken, Phase I treatment should be implemented. Addressing gingival enlargement necessitates an individualized approach that is tailored to the root cause. In cases where dental plaque is the culprit, nonsurgical treatment focuses on enhancing oral hygiene [6].

To achieve optimal oral health, it is crucial to undergo professional cleaning procedures such as scaling and root planning, which effectively eliminate plaque and calculus. Equally important is patient education, which emphasizes the significance of proper brushing and flossing techniques, the utilization of antimicrobial mouthwashes, and the regularity of dental visits. Additionally, it is essential to address local factors that contribute to plaque formation, such as making necessary adjustments or replacements to problematic restorations and modifying orthodontic appliances to minimize plaque buildup [6].

When nonsurgical methods prove to be ineffective, the appropriate course of action for treating gingival enlargement is surgical intervention. One such surgical procedure is gingivectomy, which entails the removal of excess free gingival tissue, allowing patients to maintain proper oral hygiene [7].

Gingivectomy is defined as the surgical removal of the gingiva by removing the periodontal pocket walls, providing access and visibility for complete calculus removal, and smoothing the tooth roots, creating an environment conducive to the healing of the gingiva, and restoring the physiological the contour of the gingiva [8]. Gingivectomy can be performed with a scalpel, electrosurgery, and laser [9]. Traditional gingivectomy is still performed with a scalpel and is the most common method today. It has the advantages of being a being a low-cost and durable instrument, but hemostasis can be difficult to achieve [10,11].

In the past decade, lasers have received much attention as an adjunct to periodontal surgery because they offer a less invasive approach [12]. Lasers are a relatively new modern technology, developed by Maiman in 1960 [13]. Researchers have studied the application of lasers in dental procedures encompasses both soft and hard tissues [14]. However, in the oral cavity, it was initially successfully applied in 1977 and has been improved and updated over time [15].

Diode lasers generally do not interact with hard tooth tissue, making them excellent surgical lasers for soft tissues [16,17]. The advantages of diode lasers for soft tissues are their excellent cutting properties, cutting depths of 2–6 mm, obstruction of lymphatic and small blood vessels, which causes hemostasis, and minimalized edema following surgery [18]. It also disinfects the target tissue by local heating and the formation of a scab layer, and scarring is reduced due to reduced postoperative tissue contraction [19-21], accelerated wound healing, and pain relief [22]. The aim of this study was to assess the efficacy of diode lasers (810-980 nm) in treating gingival

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enlargement caused by orthodontic appliances.

Materials and Methods

A total of 20 individuals, ranging in age from 14 to 28 years old, were selected to participate in the research. These patients had been diagnosed with gingival enlargement caused by orthodontic appliances and poor oral hygiene. The patients underwent an assessment of their plaque index (PI), bleeding on probing (BOP) and probing pocket depth (PPD). Following this evaluation, all patients received treatment in the form of scaling and root planning. They were also provided with instructions on proper tooth brushing techniques, the use of dental floss, and the utilization of a chlorhexidine (0.12%) mouthwash for one week to enhance their oral hygiene. Subsequently, the patients were divided into two separate groups.

Group I: Ten patients underwent gingivectomy by (810-980nm) diode lasers (Quicklase UK), were used to removal gingival enlargement due to orthodontic appliance.

Group II: Ten patients underwent gingivectomy by conventional method used scalpel blade no. (12,15) to removal gingival enlargement due to orthodontic appliance.

Clinical Intervention prior to the Surgery

During the evaluation of this visit, PI, BOP percentage, and PPD were assessed. Prior to the gingivectomy procedure as shown in Figure 1, all patients in both groups underwent non-surgical treatment, which involved scaling with an ultrasonic scaler and root planning as shown Figure 2, at least two weeks in advance. Patients were provided with oral hygiene instructions, which included brushing their teeth a minimum of three times per day, using dental floss twice daily, and utilizing a 12% chlorhexidine mouthwash twice daily for one week. Upon completion of a two-week period of non-surgical treatment, it is expected that the patients' assessment of PI, PPD, and BOP percentage will demonstrate a reduction to below 10%.

Figure 1. First visit (base line visit) evaluated gingival enlargement due to orthodontic appliance.

Figure 2. Immediately after scaling and root planning.

Conventional Surgical Technique

For the surgical procedure of the ten subjects, the site was numbed using local anesthesia, specifically 2.2 mL of a cartridge containing 2% lidocaine and 1:80,000 adrenaline (epinephrine).

To investigate pseudo pockets, a periodontal probe was utilized to identify bleeding points, which were then marked using a pocket depth marker. The initial incision

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was made 1 mm below the bleeding points, while the secondary incision was performed with blade no. 15. The excised tissue was carefully removed, and the surgical site was consistently cleansed with normal saline solution. Following the removal of the tissue, the surgical site was delicately trimmed using a Kirkland knife in a bevel direction, ensuring that only the necessary amount of tissue was removed to avoid exposing the bone. This approach allowed for the preservation of the natural shape of the gingiva once the cutting process was completed. Any remaining fibrous tissue between the teeth was excised using blade no. 12. After the surgery, the surgical site was thoroughly cleaned with surgical gauze soaked in normal saline solution, and a periodontal pack, as shown in Figure 3, was placed over the surgical area. This pack was left in place for a duration of one week.

The duration of the surgery was determined prior to its commencement. Once the operation was completed, we documented the surgery duration and bleeding score on the case sheet. The specialized dental center of Al Baladyat was where the surgical treatment took place.

Figure 3. Conventional procedure (scalpel method) for gingival enlargement due to the orthodontic appliance.

Laser Surgical Technique

For the surgical procedure of the ten subjects, the site was numbed with local anesthesia using a solution containing 2% lidocaine and 1:80,000 adrenaline, with a total of 2.2 ml administered per cartilage. The (CEJ) was determined using a periodontal probe, and bleeding points were marked using a pocket depth marker. The fiber tip was initiated by applying either articulating paper or dark chromophore, and the laser was activated to prime the fiber tip. The preparation of the fiber tip was considered complete when it ignited the articulation paper. To enhance thermal interaction with the tissue and expedite lesion removal, fiber priming was utilized to concentrate thermal energy at the fiber tip.

The technique utilized QuickLase UK's diode lasers, which emit light in the range of 810-980 nm. The diameter of the fiber tip used in the procedure was measured at 400 µm. The power output, ranging from 1.5 to 2W, seen in Figure 4, was adjusted based on the thickness of the gingival tissue. To ensure safety and minimize unwanted reflections, both the surgical team and the patient were advised to wear protective eyewear, and the surgical area was cleared of any reflective objects such as jewelry, watches, and shiny medical equipment. Tissue slices were created using a sweeping brush stroke motion with the fiber, resulting in beveled edges.

Throughout the surgical procedure, a member of the surgical team was assigned the task of positioning the suction tip near the surgical site in order to eliminate any smoke or odor that

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may arise from the laser tissue ablation process. Additionally, this individual was responsible for continuously irrigating the area with normal saline to maintain a cool environment. To prevent excessive heat generation and ensure optimal tissue condition, the laser was paused approximately every 20 seconds for thorough inspection of the gingival tissue. Any tissue debris that accumulated on the operative site and the tip was carefully removed using wet gauze. Notably, the surgical site was left uncovered without the use of a surgical pack, as depicted in Figure 5. Prior to the commencement of the surgery, the duration of the procedure was calculated. Upon completion of the surgery, the duration and bleeding score were diligently recorded on the case sheet.

Figure 4. Power setting in the diode laser (810-980).

Figure 5. Laser procedure for management of gingival enlargement due to orthodontic appliance.

The following parameters were assessed for both surgical techniques:

Patient satisfaction, PI, BOP percentage, and PPD were assessed before the surgery, and in each visit, the patient was followed the surgery [23,24]. Intraoperatively bleeding scores was assessed to determine the instrument performance for hemostasis, and it was graded as: (1) Not bleeding, (2) Self-limiting, (3) Requiring light pressure, (4) Requiring coagulation, and (5) Requiring ligation or Hemoclips [25].

Healing scores: Landry, Tumbull and Howely described an index to describe the extent of healing after periodontal surgery as (1) Very poor, (2) Poor, (3) Good, (4) Very good, and (5) Excellent [26].

Swelling score was assessed after the surgery in each visit of the patients according to following grades: (1) Not swelling, (2) Slight swelling, (3) Moderate swelling, and (4) Severe swelling [27].

Statistical Analysis

SPSS V23 software was used for all statistical analysis. Graphs and tables were utilized to illustrate results. The chi-square test was used to test if differences were significant between measurements of related numeric values. T-test and ANOVA tests were utilized to determine the significance of differences between the tested mean of repetitive measurements. The significant differentiation criterion was a P value ≤0.05.

Results

Time Duration

Laser surgery required a shorter duration per minute compared to conventional surgery (P=0.0001). This is supported by the data presented in Table 1.

Table 1. Comparative summary of the time duration in the study

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groups.

Time duration in minutes	Conventional	Laser	p-value
Mean	54.8	36.6	0.0001
SD	19.27	7.60	
Min	18	25	
Max	76	48	

Bleeding Scores

After the completion of the surgery, bleeding scores were measured. The laser group exhibited a significantly lower distribution of bleeding scores compared to the conventional group (p=0.03), Table 2.

Table 2. Comparative summary of bleeding scores in the study groups.

Bleeding score	**Conventional** N	**Laser** N
Not bleeding	٠	٨
Self-limiting	1	1
Requiring light pressure	٩	١
Requiring coagulation	0	0
Requiring ligation or Hemoclips	0	0

Pain and Discomfort

There was a decrease in pain and discomfort scores over time in both methods. However, when comparing the two methods, the laser group tended to have a lower pain and discomfort scores than the conventional group.

Plaque Index (PI)

The average PI value following laser surgery was consistently lower than the PI value obtained through the conventional method in every week, as depicted in Figure 6. The p-value obtained from the T-test for the conventional and laser methods were 0.87, 0.51, 0.43, and 0.9 for the first, second, third, fourth weeks, respectively. The results are shown in Table 3.

Table 3. Comparative statistical analysis of PI after the surgery in the study groups.

Plaque index					
Conventional	***1 Week**	**2 Weeks**	**3 Weeks**	**4 Weeks**	**P-value**
Mean	0.23	0.17	0.14	0.09	0.003
SD	0.16	0.11	0.12	0.08	
Min	0.003	0.03	0	0	
Max	0.49	0.37	0.39	0.22	
Laser					
Mean	0.23	0.14	0.14	0.08	0.001
SD	0.27	0.09	0.15	0.09	
Min	0.05	0.05	0	0	
Max	0.95	0.36	0.46	0.26	
P value	0.87	0.51	0.43	0.9	

*Started surgery T-test for columns /ANOVA for rows
/The result is significant at $p \leq .05$

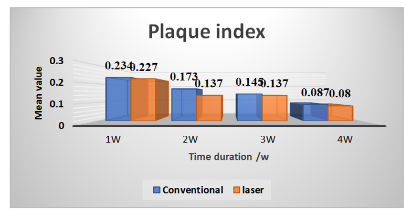

Figure 6. PI comparison.

Bleeding on Probing

The laser method consistently demonstrated a lower mean compared to the conventional method across all weeks, as illustrated in Figure 7. The difference in means was found to be statistically significant, with P-values of 0.03 and 0.002 in one week and four weeks, respectively, while P-values of 0.91 and 0.73 were observed at two and three weeks, respectively. Furthermore, the ANOVA-test revealed a statistically significant difference between the two methods, as indicated in Table 4.

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Table 4. Comparative statistical analysis of BOP percentages in the study groups.

% Bleeding on probing					
Conventional	*1 Week	2 Weeks	3 Weeks	4 Weeks	P-value
Mean	9.28	2.11	2.56	0.66	0.001
SD	9.32	1.95	3.00	1.09	
Min	1.44	0	0	0	
Max	30.24	5.04	8.4	3.24	
Laser					
Mean	3.93	2.16	2.46	0.04	0.002
SD	6.03	5.25	4.94	0.01	
Min	0	0	0	0	
Max	20.16	16.8	13.44	0.04	
P value	0.03	0.91	0.73	0.002	

*Started surgery/ T-test for columns /ANOVA for rows
The result is significant at $p \leq .05$

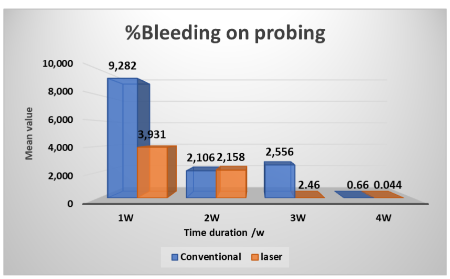

Figure 7. The distribution of mean BOP percentages in the study groups.

Swelling Scores

The score for swelling exhibited a significant reduction throughout the duration of treatment in both the laser and conventional groups. The chi-square statistic yielded a value of 4.9, while the P-value obtained from the T-test was 0.005, indicating a significant difference between the laser group and the conventional group after three weeks. This disparity is clearly illustrated in Table 5. However, the conventional group had three patients with mild swelling. After four weeks, only one patient in the laser group had mild swelling. These results are depicted in Figure 8.

Table 5. Comparative statistical analysis of swelling scores in the study groups.

Swelling score			
Tested groups	Moderate N	Mild N	No N
1 Week Conventional	4	3	3
1 Week Laser	1	5	4
P-value	The chi-square statistic is 2.4. The *p*-value is 0.29. The result is *not* significant at $p < .05$.		
2 Week Conventional	1	4	5
2Week Laser	0	4	6
P-value	The chi-square statistic is 0.04. The *p*-value is 0.97. The result is *not* significant at $p < .05$.		
3 Week Conventional	0	3	7
3 Week Laser	0	0	10
P-value	The chi-square statistic is 4.9. The p-value is 0.05. The result is significant at $p < .05$.		
4 Week Conventional	0	1	9
4 Week Laser	0	0	10
P-value	The chi-square statistic is 0.0934. The *p*-value is 0.89. The result is not significant at $p < .05$.		

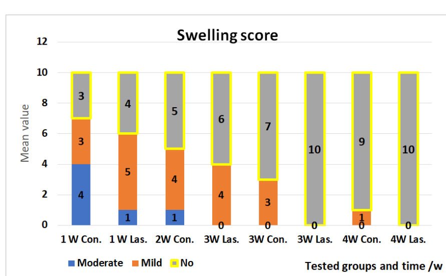

Figure 8. The distribution of mean values of the swelling scores in the study groups.

Healing Scores

Differences in healing was statistically significant using T-test at one week between the two methods (p=0.005), two weeks (p=0.03), three weeks (p=0.03), and four weeks (p=0.02), respectively (Table 6).

As shown in Figure 9, in one week after laser surgery, three out of 10 patients had a very good result in healing from the laser surgery, while no patient had a very good result in healing from the conventional surgery. In two weeks, four out of 10 patients after laser surgery had excellent results of healing, while one out of 10 patients had excellent results after conventional surgery. In three weeks, eight out of 10 patients had excellent results of healing after laser surgery, while two out of 10 had excellent results after the conventional method. In four weeks, eight patients out of 10 had excellent results of healing after laser surgery, while two patients out of 10 have excellent results after conventional surgery, so the healing result of the laser surgery was significantly different than that of the conventional method (Figures 10 and 11).

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Table 6. Comparative statistical analysis of healing scores in the study groups.

Healing Score					
Tested groups N	Very Poor	Poor	Good	Very good	Excellent
1 Week Conventional	2	7	1	0	0
1 Week Laser	0	1	6	3	0
P-value	The chi-square statistic is 4.5. The *p*-value is 0.049. The result is significant at $p < .05$.				
2 Week Conventional	0	3	4	2	1
2 Week Laser	0	2	2	2	4
P-value	The chi-square statistic is 5.6. The *p*-value is 0.034. The result is significant at $p < .0$				
3 Week Conventional	0	0	6	2	2
3 Week Laser	0	1	1	0	8
P-value	The chi-square statistic is 7.3 The *p*-value is 0.031. The result is significant at $p < .05$				
4 Week Conventional	0	0	0	6	4
4 Week Laser	0	0	1	1	8
P-value	The chi-square statistic is 9.4. The *p*-value is 0.022. The result is significant at $p < .0$				

*Started surgery/ T-test for columns /ANOVA for rows
The result is significant at $p \leq .05$

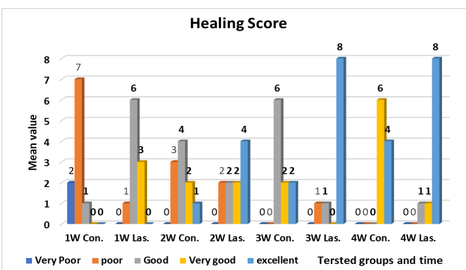

Figure 9. The distribution of means of healing scores in the study groups.

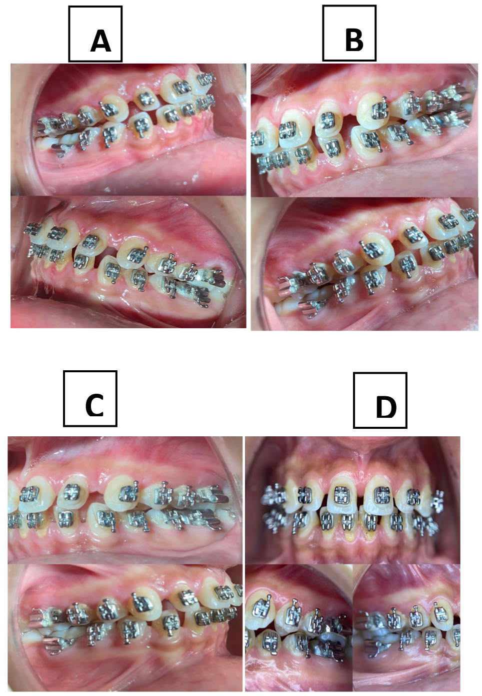

Figure 10. Follow up evaluation of healing in the laser surgery (a) after one week from the laser surgery, b) after two weeks from the laser surgery, (c) after three weeks of laser surgery, and (d) after four weeks of laser surgery.

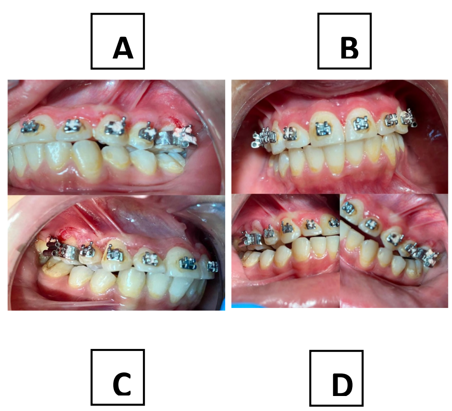

Figure 11. Follow up evaluation of healing in the conventional surgery treatment: (a) after one week of conventional surgery, (b) after two weeks of conventional surgery, (c) after three weeks of conventional surgery, and (d) after four weeks of conventional surgery.

Discussion

One of the most prevalent soft tissue issues associated with a fixed orthodontic appliance is gingival enlargement [28].

According to this study, the use of 810 nm wavelength energy was more effective in promoting coagulation in highly vascularized tissues following extensive procedures, as it significantly impacts blood factors. Conversely, the use of 980 nm wavelength energy is more suitable for ablation, as it is highly absorbed by water and results in limited tissue involvement in areas with less vascularized tissue and narrower tissue involvement. The combination of these two wavelengths enhances both

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coagulation and ablation while minimizing thermal damage [29].

In the process of photo-thermal laser-tissue interaction, the laser beam energy is absorbed by the tissue's main chromophores, which are the absorption centers. This absorption leads to an increase in tissue temperature within the area that is exposed to the laser, potentially resulting in tissue ablation and coagulation [30]. The diode laser with a wavelength of 980nm has an impact on temperature-gated calcium ion channels, while the 810nm wavelength primarily affects mitochondrial cytochrome c oxidase. When the near-surface water absorbs the 980nm wavelength, it causes changes in the temperature of protein domains. However, these temperature changes become insignificant when the overall bulk temperature is lowered. Similarly, we hypothesized that raising the temperature to 42°C would render the microscopic temperature gradients caused by water absorption of the 980nm wavelength ineffective. The interesting observation from our experiments is that both heat and cold treatments nullified the effects of the 980nm laser, but not the effects of the 810nm laser. This suggests that the 980nm wavelength can activate heat-gated ion channels, while the 810nm wavelength cannot. Furthermore, the 810nm wavelength was found to be significantly effective in promoting healing, enhancing collagen accumulation, and facilitating complete re-epithelialization [31].

In this study, it was observed that there was no bleeding during laser surgery when compared to the conventional method. This lack of bleeding can be attributed to the increase in tissue temperature that occurs after the absorption of laser light by biological tissue. Once the tissue temperature reaches 60°C, coagulation takes place through a process known as photo-coagulation. This process involves the instant denaturation of proteins, enzymes, and other bioactive molecules. As a result, there is a modification in the molecular structures of tissue collagen fibers, causing the irradiated tissue to constrict against the nearby blood vessels. Additionally, the collagen in the blood vessel walls undergoes shrinkage, which aids in improving hemostasis. Furthermore, the laser's impact on erythrocytes leads to enhanced platelet aggregation, further promoting hemostasis. Consequently, the group that underwent intraluminal laser treatment experienced minimal blood loss compared to those who underwent scalpel surgery. Diode lasers, due to their high absorption by hemoglobin and melanin, allow for precise cutting of soft tissue while ensuring excellent hemostasis. These lasers also can penetrate deeply, surpassing other types of lasers such as CO_2 lasers. As a result, the use of diode lasers reduces both the operation time and post-operative bleeding, eliminating the need for surgical packs or sutures [32].

However, there have been instances of bleeding during laser surgery in some cases specifically in the posterior teeth. On average, gingival enlargement is four times more likely to occur around posterior teeth compared to incisors and canines. This discrepancy is primarily attributed to the mechanical irritation caused by orthodontic bands, which have a higher chance of touching the gingiva around posterior teeth. Additionally, factors such as increased food impaction in the posterior areas and a tendency for more thorough brushing of anterior teeth contribute to these differences. The presence of

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exposed cement on the apical aspect of the bands may also lead to chemical irritation, while patients tend to have less effective oral hygiene practices for their posterior teeth [33]. As a result, patients may experience more inflammation and gingival enlargement in the posterior teeth due to orthodontic appliances compared to other areas.

The findings of this study reveal that laser surgery has a shorter duration compared to conventional surgery. This is because the diode laser not only removes tissue but also cauterizes blood vessels, resulting in a bloodless surgical field. This reduces the time required for the procedure. In contrast, scalpel surgery often struggles to achieve proper hemostasis, leading to longer surgical times. Additionally, gingivectomy using a surgical blade requires more instruments and steps to complete, whereas laser surgery utilizes a single surgical tip for both cutting and shaving the gingival tissue.

To compare the levels of postoperative pain and discomfort among various patient groups, the present study utilized a visual analog scale (VAS). The findings revealed that laser surgery resulted in lower levels of pain and discomfort compared to scalpel surgery at the first four days. This can be attributed to the heat produced by the laser, which inhibits the pain receptors, as well as the coagulation process that creates a dry and isolated environment, reducing the risk of infection in the wound [34,35].

In this study, PI and BOP percentage after gingivectomy by diode lasers were lower than gingivectomy by scalpel. Because the diode laser has an intense antibacterial effect by causing changes in the bacterial cell wall and destroying the cell membrane. Diode laser exerts a photo-thermal effect on the reachable bacteria. It also exerts a photo-disruptive effect on the unreachable bacteria; where immediate cell death might not occur; but rather sublethal damage occurs inhibiting the cell growth through the destruction of cell wall integrity and accumulation of denatured proteins causing the cessation of bacterial growth and consecutive cell lysis. This effect on bacteria occurs with very small doses of heat [36].

The findings of this study demonstrated that swelling is reduced in laser surgery compared to conventional surgery. This is due to the laser's ability to effectively control bleeding during the procedure by blocking lymph vessels and sealing small blood vessels. As a result, postoperative complications like swelling and edema are significantly decreased [37,38].

The healing process following laser surgery in this study was found to be faster when compared to traditional surgical methods. The fundamental concept behind the modulation of cells through laser therapy is that targeted irradiation at a specific wavelength can modify cellular behavior by influencing either the mitochondrial respiratory chain or the calcium channels within the cell membrane. This, in turn, stimulates an enhancement in cell metabolism and promotes cell proliferation. As a result, these effects contribute to an exceptional coagulation ability and trigger unique healing mechanisms that differ significantly from those observed after the use of a scalpel [39,40].

Conclusion

1.According to the obtained results, diode lasers 810-980nm can be used effectively at the

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selected power setting in the management of gingival enlargement due to orthodontic appliance.

2.Excellent hemostasis improve the vision without or with minimal bleeding in the posterior teeth in comparison to the conventional method, which does not have the hemostatic and bleeding effects during scalpel surgery.

3.Less chair time and discomfort with the laser surgery make it more acceptable to the patients in comparison to the scalpel surgery.

4.Less pain and swelling after the laser surgery.

5.Faster healing is observed to the laser group.

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