

Original Research

Comparison of conventional and diode laser to assess bone level in implant supported overdenture

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ABSTRACT:

Background: The advent of osseointegrated implants has greatly enhanced the treatment outcome in edentulous patients and has been advocated as a predictable and successful therapeutic concept for many decades. The present study was conducted to compare conventional and diode laser to assess bone level in implant supported overdenture. **Materials & Methods:** 20 implant sites among 10 patients was divided into two groups ie. Group I which was conventional second stage and group II which was diode laser. Measurements were made on mesial and distal sides using intraoral periapical radiographs and four sides (mesial, distal, labial, lingual) using CBCT scans in both groups. These measurements were done immediately after implant loading and 24 weeks after implant loading. **Results:** There was non- significant difference in crestal bone level measured at baseline and at 24 weeks of loading between groups 1Aa and 2Aa, 1Ab and 2 Ab, 1ADa and 2ADa, 1ADb and 2ADb. The difference was non- significant ($P > 0.05$). There was non- significant difference in crestal bone level measured at baseline and at 24 weeks of loading between groups 1Ba and 2Ba, 1Bb and 2Bb, 1BDa and 2BDa, 1BDb and 2BDb. The difference was non- significant ($P > 0.05$). **Conclusion:** There was no difference in crestal bone loss between conventional and diode laser technique.

Key words: Crestal bone loss, Dental implant, Diode laser

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INTRODUCTION

The aim of modern dentistry is to restore the patient to normal contour, function, comfort, esthetics, speech, and health, whether by removing caries from a tooth or replacing several teeth.¹ Loss of teeth has been a part of expected course of ageing. Edentulism still has a high prevalence in the elderly population and is generally considered a common clinical entity.² A

dental implant is a perimucosal device which is biocompatible and bio functional. An implant is placed within the mucosa or on bone associated with the oral cavity to provide support for fixed or removable prosthetics. The advent of osseointegrated implants has greatly enhanced the treatment outcome in edentulous patients and has been advocated as a

predictable and successful therapeutic concept for many decades.³

In both cases, natural teeth or implants support the attached gingiva around the restoration providing long-term, aesthetic and functional prosthetic restorations.⁴ The biological width is comprised of sulcus depth, junction epithelium and connective tissue attachment up to the alveolar bone crest. Normal, healthy subjects demonstrate an adequate biologic width when a 2 mm to 2.5 mm distance is present from the base of the gingival sulcus to the height of the crestal bone.⁵ In the absence of any periodontal disease there is a normal variation in biologic width around a tooth. Different types of dental lasers including diode laser have been used for second-stage implant surgery. They demonstrated safety, ease of use, faster recovery and accelerated start of the restorative phase. Diodes come in different wavelengths, the energy from these lasers target pigments such as hemoglobin and melanin in the soft tissue.⁶ The present study was conducted to compare conventional and diode laser to assess bone level in implant supported overdenture.

MATERIALS & METHODS

The present study comprised of 20 implant sites among 10 patients of both genders. The consent was obtained from all patients before starting the study. Demographic data of patients was recorded. Patient’s implant site was divided into two groups ie. Group I which was conventional second stage and group II which was diode laser. A careful insertion of dental implant was performed. Measurements were made on mesial and distal sides using intraoral periapical radiographs and four sides (mesial, distal, labial, lingual) (as 1Aa, 1Ada, 1Ba, 1BDa, 1 Ca, 1CDa, 1Da, 1 Dda and 1Ab, 1Ada, 1Bb, 1BDb, 1 Cb, 1CDB, 1b, 1 Ddb) using CBCT scans (as 2Aa, 2Ada, 2Ba, 2BDa, 2 Ca, 2CDa, 2Da, 2 Dda and 2Ab, 2Ada, 2Bb, 2BDb, 2Cb, 2CDB, 2b, 2 Ddb) in both groups. These measurements were done immediately after implant loading and 24 weeks after implant loading. The values obtained were subjected to statistical analysis. P value <0.05 was considered significant.

RESULTS

Table I Assessment of crestal bone level between groups 1Aa and 2Aa, 1Ab and 2 Ab, 1ADa and 2ADa, 1ADb and 2ADb

Groups	Mean	t	P value
Group I (loading)	-0.082	-0.21	0.14
At 24 weeks	-0.132	-0.52	0.21
Group II (loading)	-0.251	-0.51	0.42
At 24 weeks	-0.120	-0.38	0.35

Table I shows that there was non- significant difference in crestal bone level measured at baseline and at 24 weeks of loading between groups 1Aa and 2Aa, 1Ab and 2 Ab, 1ADa and 2ADa, 1ADb and 2ADb. The difference was non- significant (P> 0.05).

Table II Assessment of crestal bone level between group 1Ba and 2Ba, 1Bb and 2Bb, 1BDa and 2BDa, 1BDb and 2BDb

Groups	Mean	t	P value
Group I (loading)	-0.21	-0.62	0.24
At 24 weeks	-0.15	-0.42	0.51
Group II (loading)	-0.00	0.81	0.38
At 24 weeks	-0.24	1.00	0.72

Table II shows that there was non- significant difference in crestal bone level measured at baseline and at 24 weeks of loading between groups 1Ba and 2Ba, 1Bb and 2Bb, 1BDa and 2BDa, 1BDb and 2BDb. The difference was non- significant (P> 0.05).

DISCUSSION

Edentulism is a common clinical entity considered as an expected part of aging. Dental implants, a titanium surgical fixture with a root form and placed at the original position of natural teeth have been advocated in recent decades as an excellent option to treat tooth loss changing Dentistry.⁷ Following this trend, a large part of modern researches is based on novel

alternatives and techniques to perform less aggressive oral surgical procedures. With regards to implantology, laser devices are used in different procedures such as implant placement, second-stage surgery, peri-implant tissue management, and peri-implantitis treatment; however, there is not enough evidence-based information to confirm definitively their advantages over conventional techniques.⁸

According to The McGill and York consensus statements on overdentures, “The evidence currently available suggests that the restoration of the edentulous mandible with a conventional denture is no longer the first choice for prosthodontic treatment. There is now overwhelming evidence that an implant supported overdenture has become the first choice of treatment for the edentulous mandible.”⁹ The present study was conducted to compare conventional and diode laser to assess bone level in implant supported overdenture.

In present study, we found that there was non-significant difference in crestal bone level measured at baseline and at 24 weeks of loading between groups 1Aa and 2Aa, 1Ab and 2 Ab, 1ADa and 2ADa, 1ADb and 2ADb. Awazli et al¹⁰ evaluated the effectiveness of using a 940 nm diode laser in second stage implant surgery compared to a conventional scalpel approach. Twenty-one patients, with a total of 112 endosseous dental implants, were identified as having Osseo integrated dental implants and who were ready for second stage dental implant surgery were divided into two groups: 1) scalpel exposure and 2) laser exposure using a 940-nm diode laser. The 940 nm diode laser resulted in minimal postoperative pain, decreased edema with less inflammatory response, enhanced homeostasis, and regular wound healing. The laser treatment also decreased the time required for final impression and improved patient health quality life.

We observed that there was non-significant difference in crestal bone level measured at baseline and at 24 weeks of loading between groups 1Ba and 2Ba, 1Bb and 2Bb, 1BDa and 2BDa, 1BDb and 2BDb. Bajaj et al¹¹ evaluated the crestal bone change around 16 implant sites distributed in two groups (eight implants each) following two methods during second-stage surgery, i.e., Group 1 - Conventional second stage and Group 2 - Diode laser. Measurements were made on two sides (mesial and distal) using intraoral periapical and four sides (labial, lingual, mesial, and distal) using CBCT scans for both groups. These measurements were conducted at two-time intervals for both, i.e., immediately after implant loading and twenty 4 weeks after implant loading. Crestal bone loss at the time of loading for Group 1 evaluated by CBCT was 0.950 ± 0.988 while after 24 weeks of loading, it was 1.388 ± 0.576 . For Group 2, mean crestal bone loss was 1.200 ± 0.925 at the time of loading, and after 24 weeks, it was 1.512 ± 0.674 . Crestal bone loss at the time of loading for Group 1 evaluated by DR was 1.075 ± 0.849 while after 24 weeks of loading, it was 1.562 ± 0.480 . For Group 2, mean crestal bone loss was 1.162 ± 0.833 at the time of loading and after 24 weeks, it was 1.700 ± 0.498 . da Silva et al¹² compared the conventional scalpel technique and the use of a high power diode laser for second-stage implant surgery. Fifteen patients were randomly assigned to receive either the conventional scalpel technique (Control group, n = 7) or a diode

laser-assisted technique (Laser group, n = 8) for second-stage surgery of submerged dental implants placed at bone level. The local anesthetic amount required, and the total surgical time was determined just after surgery. Local pain, peri-implant mucosa status, and bleeding were assessed at the end of the surgery and after 7 and 15 days. The surgical time was significantly shorter in the Laser group (P = 0.001) and only the control Group presented bleeding at the end of surgery and on the seventh day.

CONCLUSION

Authors found that there was no difference in crestal bone loss between conventional and diode laser technique.

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