

ORIGINAL RESEARCH

Assessment of bone level in implant supported overdenture using conventional and diode laser

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Received: 12 January, 2016

Accepted: 24 March, 2016

ABSTRACT

Background: Edentulism is a common clinical entity considered as an expected part of aging. The present study was conducted to compare conventional and diode laser to assess bone level in implant supported overdenture.

Materials & Methods: 40 implant sites were divided into two groups. Group I which was conventional second stage and group II was diode laser side. 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. **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 2Ab, 1ADa and 2ADa, 1ADb and 2ADb. 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. **Conclusion:** There was non-significant difference in crestal bone loss assessed using conventional and diode laser technique.

Key words: Diode laser, Dental implant, prosthetic restorations

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INTRODUCTION

Edentulism is a common clinical entity considered as an expected part of aging.¹ 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. In both cases, natural teeth or implants support the attached gingiva around the restoration providing long-term, aesthetic and functional prosthetic restorations.² The biological width is comprised of sulcus depth, junction epithelium and connective tissue attachment up to the alveolar bone crest.³ 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.⁴ 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.⁵ 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 40 implant sites in 20 patients of both genders. The written consent was obtained from all patients.

Data of patients such as name, age, gender etc. was recorded. Patient's implant site was divided into two groups. Group I which was conventional second stage and group II which was diode laser side. A careful insertion of dental implant was performed. All were subjected to intraoral periapical radiographs and measurements were made on mesial and distal sides (mesial, distal, labial, lingual) (as 1Aa, 1Ada, 1Ba, 1BDa, 1Ca, 1CDa, 1Da, 1Dda and 1Ab, 1Ada, 1Bb, 1BDb, 1Cb, 1Cdb, 1b, 1Ddb) 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 less than 0.05 was considered significant.

RESULTS

Table I: 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)	-0.084	-0.23	0.18
At 24 weeks	-0.131	-0.50	0.25
Group II (loading)	-0.248	-0.54	0.41
At 24 weeks	-0.124	-0.34	0.36

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.

Table II: 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)	-0.24	-0.61	0.21
At 24 weeks	-0.17	-0.45	0.52
Group II (loading)	-0.00	0.83	0.34
At 24 weeks	-0.21	1.00	0.74

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.

DISCUSSION

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. 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.⁶ A dental implant is a peri-mucosal device which is biocompatible and bio functional.⁷ 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 osseo-integrated implants has greatly enhanced the treatment outcome in edentulous patients and has been advocated as a predictable and successful therapeutic concept for many decades.⁸ Following this trend, a large part of modern researches is based on novel alternatives and techniques to perform less aggressive oral surgical procedures.⁹ 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.¹⁰ The present study was conducted to compare conventional and diode laser to assess bone level in implant supported overdenture.

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. In a study by Leja et al¹¹, they reported that during implant radiation using a diode laser with a 980 nm wavelength and at average power of 1 W without air-cooling, implant overheating occurred considerably in comparison with power of 2 W. Kreisler et al¹² compared the effects of various laser wavelengths on titanium implants and he concluded that neodymium-doped yttrium aluminum garnet (YAG) and holmium:YAG lasers are contraindicated on osseointegrated implant surface irrespective of power output, the erbium-doped YAG and CO₂ output powers must be limited to avoid implant damaging while Gallium-Aluminum-Arsenide are safely used as no structural damage to the implant surface was occurred after laser irradiation

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. Dreiseidler et al¹³ have investigated and analyzed the accuracy of peri-implant bone evaluation using CBCT, digital intra-oral radiographs and histology.[20] Their study wraps up the conclusion stating that three-dimensional CBCT provides usable information about bone in all dimensions around implants with varying accuracy.

CONCLUSION

Authors found that there was non- significant difference in crestal bone loss assessed using conventional and diode laser technique.

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