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Comparative evaluation of the efficacy of ozonated water and diode laser as an adjunct to scaling and root planing in the treatment of chronic eriodontitis– a randomized controlled split mouth clinical trial.

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Abstract:
Periodontitis is a silent disease and is one of the most common oral disease in humanbeings;that damages the soft tissue and supportingstructuresof theteeth. The purpose of this study is to compare the efficacy of Ozonated WaterandDiodeLaserasadjuncttoscalingandrootplanninginmildtomoderateperiodontitis .The purpose of this study is to compare the efficacy of Ozonated WaterandDiodeLaserasadjuncttoscalingandrootplanninginmildtomoderateperiodontitis .Fiftypatientsintheagegroupof25-50yearsofboththesexessufferingfromGeneralizedChronicMildtoModerateperiodontitiswereselectedfromtheoutpatientdepartment of Periodontology and Oral Implantology.InthepresentstudyprobingpocketDepth,GingivalIndex,sulcusbleedingindex, clinicalattachmentLevelwereselectedastheclinicalparameters.Ahighlysignificantdecrease in the Probing Pocket Depth, Gingival score, sulcus bleeding index and gainin Clinical Attachment Levelat 4 weeks, 3 months and 6 months were observed in allthree groups, indicating that both ozonated water and diode laser were almost equallyeffective as adjuncts to scaling and root planing.Thus, the results of the present studyclinically favor the use of both ozonated waterirrigation and diode laser as an adjunct to scaling and root planing in the treatment ofchronicmild tomoderate periodontitis.

Keywords: ozonated, laser, periodontitis

INTRODUCTION

Periodontitis is a silent disease and is one of the most common oral disease in humanbeings;that damages the soft tissue and supportingstructuresof theteeth.Ahealthymouth is colonized bymorethan 700species ofbacteria , most of which arecompletely harmless and live in harmony with their host. However when there isdisturbance in this microbiological ecosystem due to improper maintenance of

oralhygieneorloweredimmunity;thesebacterialdepositsproliferatesontheteethandneart ogingiva, forming plaque. Thus, encouraging conditionsfor initiation of periodontaldisease. As the disease progresses, chronic inflammation causes destruction of thealveolarbonesurroundingthe tooth resultingin loss of tooth.Periodontitis is defined as 'an inflammatory disease of the supporting tissues of theteethcausedbyspecificmicro-organismsorgroupsofspecificmicro-organisms,resulting in progressive destruction of the periodontal ligament and alveolar bone withpocketformation, recession orboth.'
Chronic periodontitis is the most common form of periodontitis and is associated withtheaccumulationofplaqueandcalculus.Successfulperiodontaltreatmentisdependento n controlling the tissue destruction, elimination or control of etiologic agents alongwitha microbial shift towards healthyflora. Ozone has been recently advocated as an irrigating agent predominantly due to itsantimicrobialactionwhichresultsfromoxidationofmicrobialcellularcomponentsandalte ringthesubgingival homeostasis.[22] One very exciting technology making great inroads into lot of areas of dentistry todayis the LASER technology. The use of DL is one of the most promising new technical modalities for nonsurgicalperiodontaltreatmentandhasanadvantageofreachingsitesthatcannotbeappro achedbyconventional mechanical instrumentation. The purpose of this study is to compare the efficacy of OzonatedWaterandDiodeLaserasadjuncttoscalingandrootplanninginmildtomoderateper iodontitis.

MATERIALS & METHODS
Fiftypatientsintheagegroupof25-50yearsofboththesexessufferingfromGeneralizedChronicMildtoModerateperiodontitisw ereselectedfromtheOutpatientdepartment of Periodontology and Oral Implantology, D.Y.Patil school of dentistry,Nerul,Navi Mumbai.

PATIENTSELECTION:

A. Inclusioncriteria-

1. Patients from the age group of 25 to 50 years diagnosed as cases of ChronicMild (1-2mm CAL) to Moderate (2- 4 mm CAL) Generalized PeriodontitisaccorAdingtocriteriabyWorld Workshop in Periodontics1999.
2. Systemicallyhealthysubjects.

3. No history of undergoing any surgical treatment of periodontitis or use ofantibioticsin thelast 6 months period.

B. **Exclusioncriteria**-

1. Patientswithhabitof smokingandchewingtobaccoor gutkha.

2. Pregnantorlactatingwomen.

3. PatientswithsystemicdiseaseslikeRespiratoryDisorders,cardiovasculardiseases

and myocardial infarction, hyperthyroidism, Auto Immune Disordersetc.

STEPSINTHECONDUCT OFTHESTUDY:

1. Aclinical,splitmouthstudydesignwas used.

2. Patientswereselectedbasedontheinclusionandexclusioncriteria.

3. Allsubjectsunderwentscalingandrootplaning.

4. Patientswererandomlyassignedtoreceiveoneofthefollowingtreatments inthestudyquadrants.

GROUPS	QUANDRANT	IRRIGANTSYSTEMUSED
groupI	1st or 2nd quandrant	Scalingandrootplaning alongwith diodelaser
GroupII	3rd or 4th quandrant	Scalingandrootplaning alongwith ozonated water
Group III	1st or 2nd or 3rd or 4th quandrant	Scalingandrootplaning alone

Testgroup1: ozonated waterasadjunctto scalingandroot planing.
Testgroup 2:diodelaser asadjunct to scalingandroot planing
ControlGroup:ScalingandRoot Planing.

RESULTS

The study comprised of 50 systemically healthy patients, 3 teeth per patient wererandomlyallotted with different treatment modalities.
Intragroupcomparison:

1. SCALINGANDROOTPLANING:

a) Gingivalindex:Atbaselinethemeangingivalindexvalue wasfoundtobe(1.461±0.4224).Therewasagradualdecreaseinmeangingivalindexvaluein 4weeks(1.246±0.3469),3months(1.050±0.2536),6months(0.878±0.2 170)

(Scaling&Rootplaning)

Table1:ComparisonofGingivalindexvaluesintermsof{Mean(SD)}atdifferenttime intervals in scaling & root planing group using repeated measures ANOVAtest

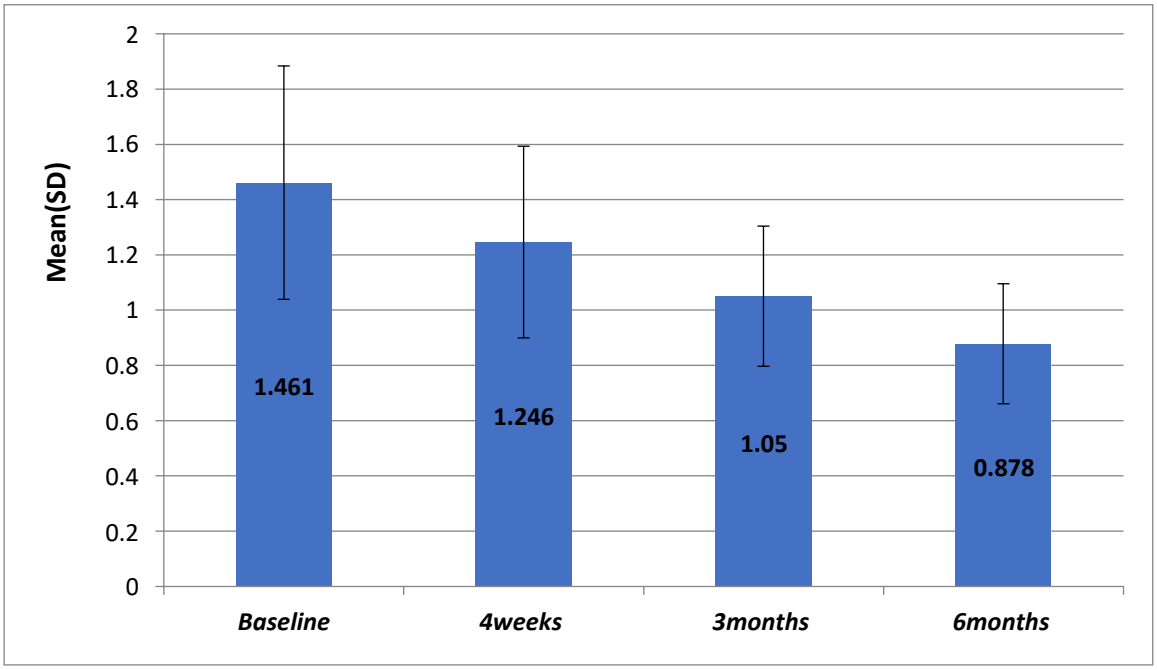
Group	*N*	*Mean*	*Std.Deviation*	*Wilk's Lambdavalue*	*P value*

Baseline	46	1.461	0.4224	53.674	<0.001**
4 weeks	46	1.246	0.3469		
3months	46	1.050	0.2536		
6months	46	0.878	0.2170		

(p<0.05-Significant*, p<0.001-Highlysignificant**)

(Scaling&Rootplaning)

Figure1:ComparisonofGingivalindexvaluesintermsof{Mean(SD)}atdifferenttime intervals in scaling & root planing group using repeated measures ANOVAtest



b) Sulcusbleedingindex:

Atbaselinethemeansulcusbleedingindexvaluewasfoundtobe(1.580±0.2825),followed by gradual decrease in mean sulcus bleeding indexin 4weeks(1.296±0.2582),3months(1.074±0.1902),6 months(0.835±0.1649).

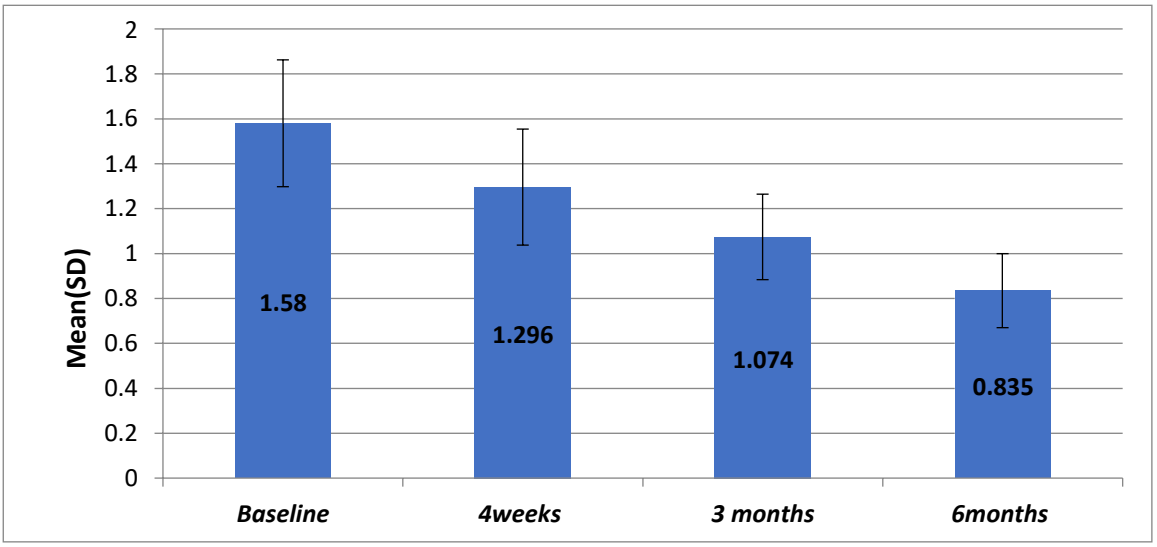
Table 2: Comparison of Sulcus bleeding index values in terms of {Mean (SD)} atdifferent time intervals in scaling & root planing group using repeated measuresANOVAtest

Group	*N*	*Mean*	*Std.Deviation*	*Wilk's Lambdavalue*	*P value*

Baseline	46	1.580	0.2825	189.856	<0.001**
4 weeks	46	1.296	0.2582		
3months	46	1.074	0.1902		
6months	46	0.835	0.1649		

(p<0.05-Significant*, p<0.001-Highlysignificant**)

Figure 2: Comparison of Sulcus bleeding index values in terms of {Mean (SD)} atdifferent time intervals in scaling & root planing group using repeated measuresANOVAtest



c) Pocketprobingdepth:

Atbaselinethemeanpocketprobingdepthscorewasfoundtobe5.07±0.854,followedby gradual decrease in mean pocket probing depth in 4 weeks (3.91±0.784), 3 months(3.13±0.687),6 months (2.80±0.500).

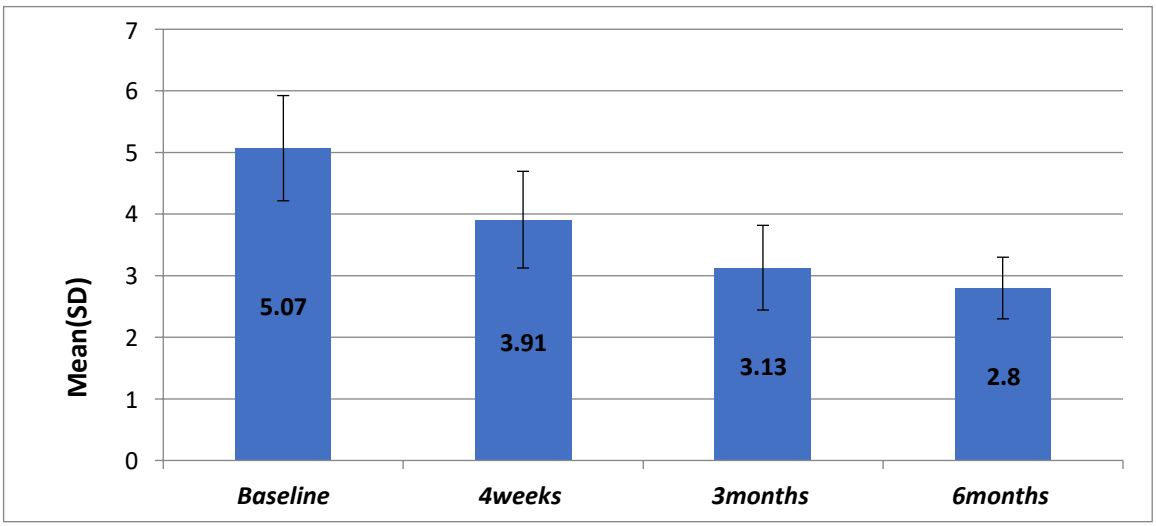
Table 3: Comparison of Pocket probing depth values in terms of {Mean (SD)} atdifferent time intervals in scaling & root planing group using repeated measuresANOVAtest

Group	*N*	*Mean*	*Std.Deviation*	*Wilk's Lambdavalue*	*P value*
Baseline	46	5.07	0.854		
4 weeks	46	3.91	0.784		

3months	46	3.13	0.687	155.707	<0.001**
6months	46	2.80	0.500		

(p<0.05-Significant*, p<0.001-Highlysignificant**)

Figure 3: Comparison of Pocket probing depth values in terms of {Mean (SD)} atdifferent time intervals in scaling & root planing group using repeated measuresANOVAtest



d) ClinicalAttachment Level.

At baseline the mean Clinical Attachment Level score was found to be (5.59±0.884) ,therewasgradualdecreaseinmeanClinicaAttachmentLevelin4weeks(3.91±0.784) ,3months(3.13±0.687),6months(2.80±0.500).

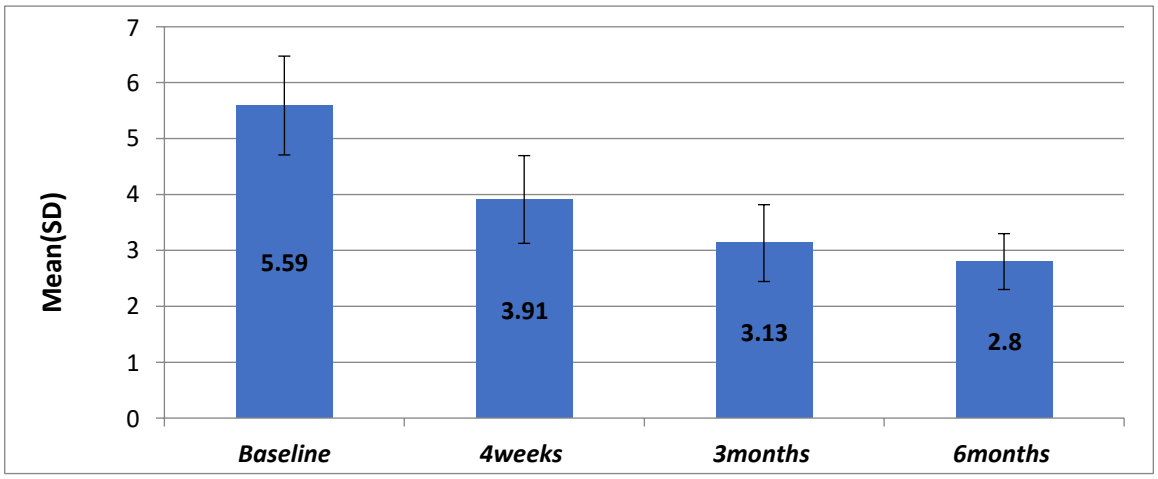
Table 4: Comparison of Clinical attachment level values in terms of {Mean (SD)}atdifferenttimeintervalsinscaling&rootplaninggroupusingrepeatedmeasuresANOV Atest

Group	*N*	*Mean*	*Std.Deviation*	*Wilk's Lambdavalue*	*P value*
Baseline	46	5.59	0.884	186.112	<0.001**
4 weeks	46	3.91	0.784		
3months	46	3.13	0.687		

6months	46	2.80	0.500		

(p<0.05-Significant*, p<0.001-Highlysignificant**)

Figure 4: Comparison of Clinical attachment level values in terms of {Mean (SD)}atdifferenttimeintervalsinscaling&rootplaninggroupusingrepeatedmeasuresANOV Atest



2. OZONE:

a. Gingival Index:

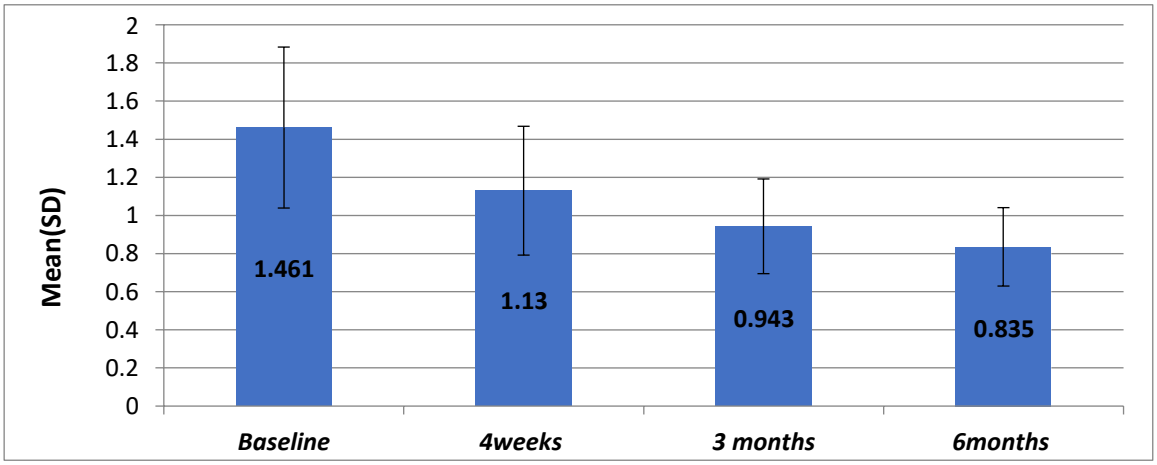
At baseline the mean gingival index valuewas found to be(1.461 ±0.4224).Therewasa gradualdecreasein meangingivalindexvaluein4weeks(1.130±0.3379),3months(0.943 ±0.2482), 6 months(0.825 ±0.2057).

Table5:ComparisonofGingivalindexvaluesintermsof{Mean(SD)}atdifferenttimeintervals inozonegroupusing repeatedmeasures ANOVA test

Group	*N*	*Mean*	*Std.Deviation*	*Wilk's Lambdavalue*	*P value*
Baseline	46	1.461	0.4224	71.679	<0.001**
4 weeks	46	1.130	0.3379		
3months	46	0.943	0.2482		

6months	46	0.835	0.2057		

Figure5:ComparisonofGingivalindexvaluesintermsof{Mean(SD)}atdifferenttimeinterval sinozonegroupusingrepeatedmeasuresANOVAtest



SulcusBleedingIndex:

Atbaselinethemeansulcusbleedingindexvaluewasfoundtobe(1.657±0.2455),followed by gradual decrease in mean sulcus bleeding indexin 4weeks(1.304±0.2180),3months(0.998±0.1719),6 months(0.804±0.1788).

DISCUSSION

Periodontal disease is one of the prevalent illnesses in the adult population. It ischaracterized by a symptom triad: Tooth mobility, foetor ex ore, gingival bleeding. Ifleft untreated the disease can lead to tooth loss. The aim of periodontal treatment is toeliminatetheoralinfection,andpreventtheprogressionofthedisease.[60] The use of ozone is justified as a new option of irrigating agent with antimicrobialaction which results from oxidation of microbial cellular components. It has highantimicrobial power against bacteria and fungi without resistance. Gases like ozonemay be more advantageous for intraoral use than liquids because of their differentphysicalcharacteristicsanddiffusionpotentials. The present study is a comparative evaluation of the efficacy of ozonated water anddiode laser as an adjunct to scaling and root planing in the treatment of chronicperiodontitis-Aclinicalrandomized,splitmouthstudy.ItwasconductedinthedepartmentofPeriodontolog

y,D.Y.Patilschoolofdentistry,Nerul,NaviMumbai,withan objective to evaluate and compare the effect of ozone water and diode laser alongwith scaling and root planing on clinical parameters such asGingival Index, sulcusbleeding index, Probing Pocket Depth and Clinical Attachment Loss in the treatmentof chronicperiodontitis.
InthepresentstudyprobingpocketDepth,GingivalIndex,sulcusbleedingindexand ClinicalAttachmentLevelwereselectedastheclinicalparameters.Ahighlysignificantdecreas e in the Probing Pocket Depth, Gingival score, sulcus bleeding index and gainin Clinical Attachment Levelat 4 weeks, 3 months and 6 months were observed in allthree groups, indicating that both ozonated water and diode laser were almost equallyeffective as adjuncts to scaling and root planing. However ozonated water showedslightly better results, which were statistically not significant, however at 3 monthsozoneshowedbetterresultsthanlaser.0zoneiscurrentlybeingdiscussedasapossibl ealternative agent because it is strongly antimicrobial, biocompatible, does not inducemicrobial resistance and is free from side effects. In the present study despite theozonated water irrigation has shown equal or slightly better results in terms of clinicalparametersmeasured. Thus Within the limitations of this study, ozonized watersubgingivalirrigationiseffectiveinimprovingoralhygiene,reducinggingivalinflamma tion, decreasing pocket depth and increasing attachment levels when used asan adjunct to scaling and root planing in patients with chronic periodontitis hence inourstudyweconcludethatthroughSRPweachievedgoodresultsandifanyadjunctisrequire d , looking at the cost factor and patient comfort ozone can be more preferredthan laser as an alternative management strategy, ozonated water irrigation which iseconomic ,and has fewer side effects and better patient compliancecan be consideredapowerfultooltoinactivatemicroorganismsfrommicrobialplaquealongwithmo dulatingimmune responseduringperiodontal therapy.

CONCLUSION

Thus, the results of the present studyclinically favor the use of both ozonated waterirrigation and diode laser as an adjunct to scaling and root planing in the treatment ofchronic mild tomoderate periodontitis. This study indicates that clinical effectsachieved with both the treatment modality may reduce the need for further advancedandsurgicalperiodontaltreatment,whichwouldreducethetimeoftreatmentandc ostof the therapy.

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