**Student name : Tenzin Dhasal**

**Article Title : Antibacterial Effectiveness Of Low Energy Diode Laser Irradiation On Management Of Periodontitis In Down Syndrome.**

**Class section : DEN1200/D200**

**Date : 04/10/14**

**Part IV**

**1.When was the work published?**

The work was published on April 2012.

**2.What are the main points of the article? Write a 150-200 words summary of the article that accurately conveys the content of the article.**

The main objective of this study was to evaluate the antibacterial effectiveness of an 870-nm diode laser for the treatment of periodontitis along with the mechanical treatment procedure such as scaling and root planning. According to this article, Down syndrome patients encounter significantly high incidence of early onset aggressive Periodontal disease. 35 Down Syndrome patients from 12-19 years old with periodontitis were divided into two groups. Group I included 25 patients who were applied with laser treatment on one half of the mouth and the other half was considered as a control. Group II included 10 patients who were applied with basic periodontal treatment to evaluate the

effect of laser. The study evaluate the effect of laser treatment in subduing certain bacteria which play a significant role in inducing and maintaining the inflammatory process. The PCR technique was used as a baseline at three different time period which were at 2 weeks, at 6 weeks and at 12 weeks post periodontal and laser treatment.

Before the test, all the participant patients were given periodontal treatment including scaling and root planning on all mouth. The mouth of group I was then divided into two sides. On the right side of the mouth, scaling and root planning (SRP) was done with the standard technique and low level laser therapy with 870 nm wavelength was applied. The left side of the mouth was also given scaling and root planning (SRP) with the standard technique but WITHOUT the laser therapy application.

As a result, The Group I showed significant difference between right and left side of the mouth. The right side mouth of the Group I patients which received scaling and root planning with the applied laser therapy (SRP+LAS), at different follow up period showed significant decrease in the plaque index, gingival index and mean level of attachment after 2 weeks and 6 weeks with no change after 12 weeks. The pocket depth decreased significantly after 2 weeks, 6 weeks and 12 weeks from that of the baseline score. The degree of mobility didn’t change through out the test periods.

The left side of the mouth where scaling and planning (SRP) was done, at different follow up periods showed significant decrease in the plaque index, Gingival index, pocket depth, level of attachment after 2 weeks as compared to the baseline score but no changes after 6 weeks and 12 weeks. The degree of mobility didn’t change at all test period.

These results showed that using the low level laser therapy with the scaling and root planning can bring a significant change in Down Syndrome patients who suffer from periodontal disease. Laser therapy can be used for the periodontal treatment as an addition tool, along with the scale and root planning.

3.**Does the work meet the standards to be considered an**

**appropriate/academic/scholarly source?**

Yes, the work meet the standards to be considered an appropriate/academic/scholarly source. The article was peer reviewed. This article contains all the sections of a Research Report needed to be an appropriate source. It has abstract which summarizes the whole article, purpose and objective were mentioned in the introduction, detail description of the materials and methods were present, the summary of the numerical findings were included in the result, in discussion paragraph, the author mentioned about the limitation of study, summary and conclusions, and reference were all elaborated.

4.**Are the qualifications of the author(s) appropriate for an academic article? Briefly describe the authors’ qualifications.**

Yes, the qualifications of the author appropriate for an academic article. I have done some research about one of the authors Mr. Howida M. Sharaf. He is a well renown doctor of Egypt. He belongs to Department of Clinical Pathology, Faculty of medicine,

Ain Shams University Hospitals, Cairo, Egypt. He has done many other medical researches.

**5.Is the purpose clearly stated? Restate the purpose of the paper in your own words.**

Yes, the purpose of the study was clearly stated. The article clearly stated that the study was to evaluate the effectiveness of the use of lower level of laser therapy 870-nm diode along with the scale and root planning (SRP) on periodontitis in patients with Down syndrome. The author could have mentioned more about the negative effects of exposure to radiation therapy. Although, the author stated that high doses of laser radiation are effective for antimicrobial treatment but causes tissue destruction. And said that low

doses are either inactive or may stimulate the growth and reproduction of bacteria. In my opinion, the exposure to the laser radiation therapy on frequent visits may cause chronic effects on patients with Down Syndrome in long run.

**6. Is the experiment design clearly described? Describe the design in your**

**own words.**

Yes, the design was clearly described in this article. I think the examiners used

parallel split mouth design on those two experimental groups which have Down Syndrome patients suffering from periodontitis. 25 patients in Group I were applied with new laser treatment along with scaling and root planning (LAS+SRP) on one half of the mouth and other half was control. On the other hand, 10 patients in Group II received just the basic periodontal treatment (SRP) to evaluate the systemic effect of low level laser therapy on the non laser side. The design of this experiment is also longitudinal. The same sample of 35 patients were used in assessing over several different time points. The results were shown in three different time periods, accordingly at 2 weeks, at 6 weeks and at 12 weeks post periodontal and laser treatment in both groups I&II.

**7. Have the possible influences on the findings been identified and controls**

**instituted? Describe and evaluate the use of controls and possible influences**

**(spurious variables).**

The study clearly mentioned that all thirty five patients have no ongoing general

disease during the time of the experiment. Participants did not have periodontal treatment during last 6 months nor anti-microbial drugs during the last 3 months or received laser treatment before the experiment had begun.

There are possibilities of exhibiting changes in immune response that may

contribute to the development of periodontal disease in Down syndrome patient.

Generally, the immune system in Down syndrome patients fluctuates frequently as compare to other mentally retarded or healthy patients.

**8. Has the sample been appropriately selected (if applicable)? Describe the**

**sample used in the study, and evaluate its appropriateness.**

When it comes to sample selection, the random sampling is the best method in

which every member of the population gets the equal chance of being selected for

the sample. This article was not selected randomly, the sample consisted only Down syndrome patients. It said that thirty five patients were selected from

the outpatient clinic of the Orodental genetic Department of the National

Research Center, Cairo. The size of the sample is also very important to make the

experiment more efficient and successful.

The sample size should be large enough to accommodate the expected loss of

subjects. This experiment barely met the minimal size. Group I had 25 patients,

however, Group II had only 10 patients. Two groups were not equally distributed.

The unequal distribution of the sample size may affect the outcome of the experiment.

The sample selected age group ranged between 12-19 years. They have

same sample size, both at the beginning and the end of the investigation.

**9. Has the reliability and validity of the article been assessed? Evaluate, and**

**state the test/diagnosis results.**

Yes, the reliability and validity of the article have been assessed. The experiment

used means and standard deviations in calculating the coefficient of variation

(CV) for each DNA concentration. Intra-class correlation coefficient (ICCs) was

used for reliability analysis.

The results included statistical analysis obtained from SPSS program version 12. Descriptive statistics were obtained by the use of mean, standard deviation and prevalence.

**10. Is the experimental therapy compared appropriately to the control**

**therapy? Describe and evaluate the use of the control group.**

I don’t think the experimental therapy was compared to the control therapy

clearly. I am still very confused about the conclusion the author had drawn for this experiment. The examiners could have made this experiment more comprehensive by choosing equal amount of sample size for each group. One group should have applied SRP+LAS and other group with just SRP. The split mouth design performed in this experiment had made the result very perplexed. It (split mouth design) had made the experiment appear as a double control groups.

The sample size of the experimental group I was larger than the control group

II. The author mentioned detail about experimental therapy, but he had failed in

comparing the two groups fairly. The control group II in this experiment was

given with a basic periodontal treatment SRP to evaluate the systemic effect of

laser on the none laser side. Examiner’s main objective was to evaluate the

antibacterial effectiveness of laser on periodontitis in patient with Down

Syndrome. Comparison of the results were very ambiguous and confusing.

**11. Is the investigation of sufficient duration? Evaluate, and explain your reasoning.**

Yes, the duration of the investigation was sufficient. This experiment was about

how low level laser therapy affects treating periodontitis patients with Down

syndrome over a period of time. There were three different time period lengths

used in this experiment. They were at 2 weeks, at 6weeks, and at 12 weeks. The

length of this experiment was 12 weeks, which is almost three moths. The result

should be clearly evident within 3 months.

A.Actinmycetcomitans and P. gingivalis were the most common periodontal

pathogen bacteria found in Down Syndrome patient as compare to other mentally retarded or healthy patients. These bacteria were found in subgingival plaque from Down Syndrome patients compared to controls. The periodontal pathogens are susceptible to killing by red light after their sensitization with toluidine blue O (TBO). Low-output diode laser emits red and orange wavelengths, which are very efficient in damaging bacteria cells, and they are used for ophthalmology and dental applications.

**12. Have the research questions or hypothesis been answered? Restate the**

**research questions and/or Hypothesis in your own words, and describe if**

**or how they are answered.**

Yes, the research questions or hypothesis have been answered in this article. Thirty five Down syndrome patients with periodontal disease were divided into two groups. Twenty five patients were assigned in group I who were treated with laser treatment and scaling root planning on right side of their mouth (LAS+SRP) and their left side of mouth was treated with a basic scaling and

root planning only (SRP). Ten patients were assigned to a control group II that

received just scaling and root planning (SRP alone).

The text stated that the main purpose of this study was to evaluate the

antibacterial effectiveness of an 870-nm diode laser on periodontitis in patients

with Down syndrome. The result of the study was well displayed using many

statistical data and graphic diagrams.

For the data analysis, means and standard deviations were used to calculate the

coefficient of variation for each DNA concentration. For the statistical

analysis, descriptive statistics such as mean, standard deviation and prevalence

were used. The study used probability level (p) at 0.05.

Results included all the statistical data that were obtained from calculations

done through mean, standard deviation and prevalence in proving that using

scaling and root planning treatment along with the laser therapy significantly

reduces the plaque index, gingival index and mean level of attachment after 2

weeks and 6 weeks.

**13. Do the interpretations and conclusion logically follow the experimental**

**finding? Restate the conclusion, and explain if or how they follow the**

**experimental findings.**

Yes, the interpretations and conclusion logically follow the experimental

finding. Interpretations in the discussion section and the conclusion were based

on the data analysis. It used descriptive statistics including mean, standard

deviation, coefficient of variation, and prevalence in obtaining all the result

data.

The study concluded that Group I patients which were treated with laser

treatment along with the SRP on right side of the mouth showed significant

decrease in plaque index, gingival index and mean level of attachment after 2

weeks and after 6 weeks. The mean pocket depth was decreased significantly

after 2 weeks, after 6 weeks, and after 12 weeks. Whereas, the left side of the

mouth showed a significant decrease on plaque index, gingival index, pocket

depth, level of attachment after 2 weeks only. There was no change after 6 or

12 weeks from that of the baseline score (P>0.05).

**14. Do you agree or disagree with the article and findings? Explain why?**

Yes, I definitely agree with the article and findings. I have read on papers and

articles that the use of laser therapy benefits many patients and doctors in treating various medical conditions. There are several other medical conditions such as tooth decay, gum disease, biopsy or lesion removal, teeth whitening that can be treated by using laser therapy. This study has done intense evaluation on how effective the low level 870-nm diode laser therapy was in treating periodontal disease in Down syndrome patient. There were no assumptions made on the interpretations and conclusions statement. Every finding was based on data and calculation. The study used real time PCR instead of the traditional PCR. Traditional PCR is very time consuming. Real time PCR can detect as little as a two-fold change. Probability level at 0.05 (P<0.05) was set as a baseline.

Various statistical calculation methods were used in obtaining data. Thus, I agree with the article and their findings.

**15. What would you change in the article? Why? Think outside of the box. What would you add or delete.**

The only thing I would like to add would be interpretations on how the control group II was related to the whole study. The study stated that 10 control patients which were treated with SRP alone were essential in evaluating

systemic effect. However, the end results were mostly focused on the products

of group I sample only. Since, the study used the split mouth design on group

I, it had divided the group I into half, the right side mouth and the left side

mouth. The left side mouth, which was applied SRP treatment without laser,

was considered as control group. On the other hand, group II was also

considered as a control group. The examiners should have made sentence

clearer or should have chose less complex sample groups. It took me quite a

time to understand the scenario of this study. The study mentioned ‘control’

group few times, but it was not clear which control group they were

referring to. It was perplexing to some degree.