Application of Er:YAG Laser in the Treatment of Dentine Hypersensitivity

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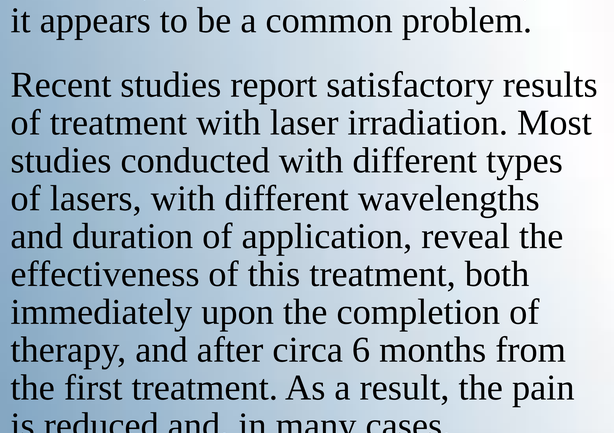
Introduction

Dentine Hypersensitivity (DH) is a frequent clinical disorder. It is defined as pain arising from exposed dentine typically in response to thermal, chemical, tactile or osmotic stimuli, and it appears to be a common problem.

Recent studies report satisfactory results of treatment with laser irradiation. Most studies conducted with different types of lasers, with different wavelengths and duration of application, reveal the effectiveness of this treatment, both immediately upon the completion of therapy, and after circa 6 months from the first treatment. As a result, the pain is reduced and, in many cases, eradicated (1,2,3). Among the published works, there are those which confirm the exceptional efficacy of the use of Er: YAG lasers in the treatment of DH.

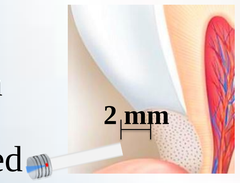
Thus, the aim of this study is to compare the effectiveness of Er: YAG laser in compare with commercially available fluoride varnish.

Materials and methods



Treatment protocol

1. Pre-test (Test1:air Test2:scrape) (degree by visual analogue scale)
2. Treatment
3. Post-test (Test1:air Test2:scrape) (degree by visual analogue scale)
4. After 14 days follow up (degree by visual analogue scale)



- Tooth tissue was around 2 mm away from the laser.
- Each site 3 applications of 60 seconds.

Laser system：
- Sapphire Er:YAG Laser system

Technical support：
- LightMed Dental Technology Corp. (Lightmed, No.96 Luke 5th. Rd., Luzhu Dist., Kaohsiung 82151 Tel : +886 7695 5111)

Results

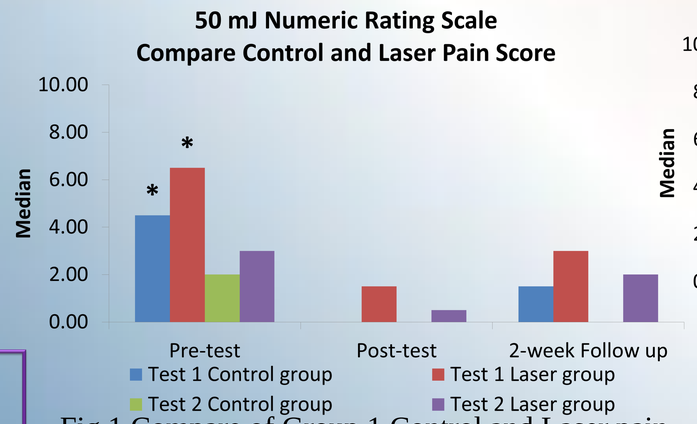


Fig.1 Compare of Group 1 Control and Laser pain score.Analysis by Mann-Whitney U test ＊: p-value < 0.05

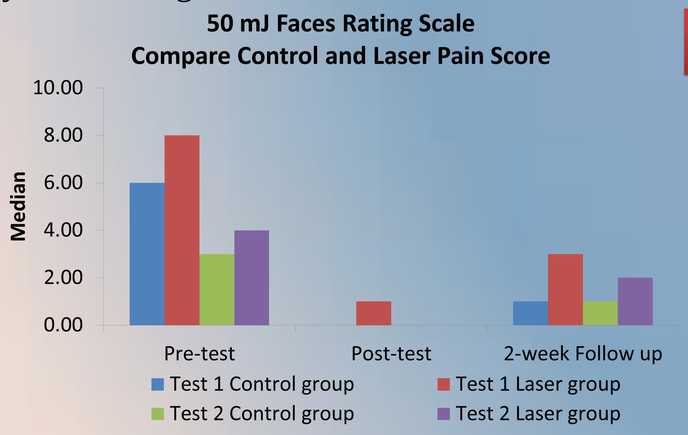


Fig.2 Compare of Group 1 Control and Laser pain score. Analysis by Mann-Whitney U test

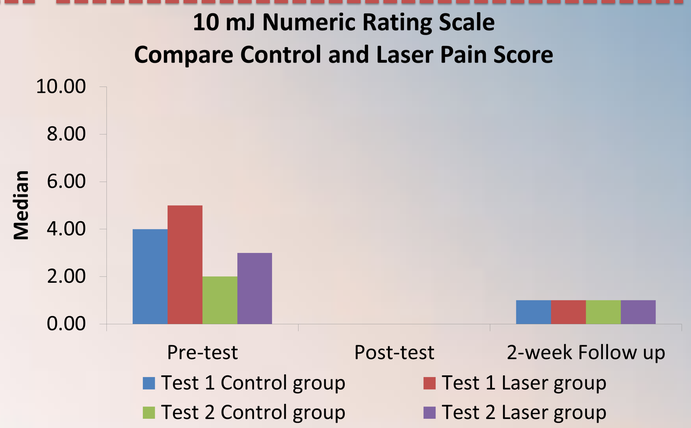


Fig.3 Compare of Group 2 Control and Laser pain score. Analysis by Mann-Whitney U test

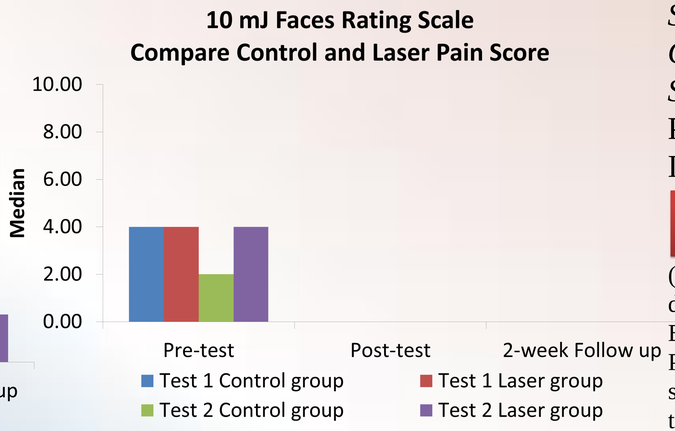


Fig.4 Compare of Group 2 Control and Laser pain score. Analysis by Mann-Whitney U test

Discussion

Significant differences occur only between the mean sensitivity values at baseline of 50mJ Numeric rating scale between control and Laser group (analysis by Mann-Whitney U test , p=0.019). These finding is the result of the effect of selection bias of randomization. The VAS value of 50mJ group at post-test was higher than 10mJ group. Based on the results, we believe that 10mJ is a suitable parameter , which sealed dentinal tubules without excessive melting of the dentine, thus achieving a better level of analgesia than 50mJ. Our research, as well as research by other authors (4), demonstrates that low-energy lasers setting have an effect on nerve endings, thus eliminating sensitivity. We believe that further research is needed to assess long-term effects of these therapeutic procedures on a larger sample in order to provide recommendations for use in routine clinical practice.

Acknowledgements

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IRB Number: *KMUHIRB-F(II)-20170083*

Reference

(1)Blatz MB. Laser therapy may be better than topical desensitizing agents for treating dental hypersensitivity. J Evid Based Dent Pract. 2012;12:69–70. (2)da Rosa WL, Lund RG, Piva E, da Silva AF. The effectiveness of current dentin de-sensitizing agents used to treat dental hypersensitivity: a sys-tematic review. (3)Quintessence Int. 2013;44:535-46. Orchardson R. Gillam DG. Managing dentin hypersensitivity. J Am Dent Assoc. 2006;137:990–8. (4) Asnaashari M, Moeini M. Effectiveness of lasers in the treatment of dentin hypersensitivity.J Lasers Med Sci.2013;4:1–7.