

Comparative Evaluation of Changes in Microhardness of Microhybrid Resin Composites due to use of Mouth Rinses: An In vitro Study

Dr. Rohit Dhoot, Dr Pooja Parakh, Dr Sarvesha Bhondwe

Abstract: *Context:* Alcohol based mouth rinses reduce the microhardness of microhybrid composite to greater extent than the non alcohol based mouth rinses *Aim:* The aim of the study was to evaluate the effect on micro hardness of microhybrid resin composites as restorative material by the use of mouth rinses. *Materials and methods:* Twenty samples of Microhybrid resin based composite were prepared using a mould which was custom modified. The specimens were randomly divided into four groups of five specimens each (n=5): Group I artificial saliva, Group II Listerine (alcohol based), Group III Lidocam (alcohol based), Group IV Hiora (alcohol free, herbal) The baseline micro hardness values of the specimens were recorded using Vicker's micro hardness. The specimens were then checked for post immersion micro hardness previously mentioned for base line values. Statistical analysis used: Paired t test was applied in all the groups to compare the microhardness before and after immersing it in the respective mouthrinses. *Results:* The p values in group II (Listerine) and group III (Lidocam) are statistically significant. Thus, there is significant reduction in the microhardness of microhybrid composites in group II and group III. *Conclusion:* Listerine mouth rinse showed maximum reduction in micro hardness of microhybrid resin composite followed by Lidocam followed by Hiora

Keywords: microhardness, Microhybrid composite, mouthrinse

1. Introduction

Tooth-coloured restorative materials have been widely used to meet patient's esthetic demands.^[1] Tooth coloured restorative materials are required to have long term durability^[2] and a high degree of long term wear resistance in the oral cavity.^[3, 4] However, the chemical environment has appreciably influenced the degradation of these materials in vivo.^[5]

Bacterial plaque is the main etiology for dental caries and periodontitis. It is not possible to achieve the desired level of plaque control using mechanical aids like tooth brush hence, the use of mouthrinses is highly appealing to patients and clinicians.^[6]

Both alcohol-containing and alcohol-free mouthrinses affect the hardness of composites.^[7]

2. Material and Method

The commercial mouth rinses used in the study are Listerine (Johnson and Johnson Ltd, Jogeshwari, Mumbai, alcohol based), Lidocam (Ajanta, Kandivli west, Mumbai, alcohol based) and Hiora (Himalaya, Makali, Bengaluru, alcohol free).

Specimen Preparation

Twenty samples of Microhybrid resin based composite (Heraeus Charisma smart composite) with five mm in diameter and five mm in height were prepared using a mould which was custom modified to get the desired size. The mould was placed on a glass slide and filled with microhybrid composite to a slight excess using composite filling instrument (GDC Marketing co, Hoshiarpur, India) covered with a clear matrix strip and another glass slide was placed on top and gently pressed for 30 seconds to remove excess material and to obtain a smooth surface.

Each specimen was cured for 40 seconds from the top and another 40 seconds from the bottom using LED light cure unit (Blue phase C8, Ivoclar Vivadent, Astria) at 800 mW/cm². The specimens prepared were kept in artificial saliva for 24 h to simulate the oral environment

pH Evaluation

The pH of all the three mouthrinses was evaluated using digital pH meter. Micro hardness testing: The specimens were randomly divided into four groups of five specimens each (n=5) as follows:

- Group I artificial saliva
- Group II Listerine (alcohol based)
- Group III Lidocam (alcohol based)
- Group IV Hiora (alcohol free, herbal).

The baseline micro hardness values of the specimens were recorded using Vicker's micro hardness tester with a load of 200 g and a dwell time of 15 seconds. The specimens were then immersed in 20 ml of respective mouth rinses and kept in an incubator at 37°C for 24 hours. The specimens were then checked for post immersion micro hardness using the same micro hardness tester previously mentioned for base line values. The data was tabulated and subjected to statistical analysis.

3. Results

Table no.2 gives the mean values of microhardness of the microhybrid composites before and after the insertion in the mouthrinse. Graph shows Comparison of microhardness of the Microhybrid composites before and after the insertion in the mouthrinse

Paired t test was applied in all the groups to compare the microhardness before and after immersing it in the respective mouthrinses. The p values in group I (artificial saliva) and group IV (hiora) are non significant. The p values in group II (Listerine) and group III (Lidocam) are

Volume 8 Issue 7, July 2019

www.ijsr.net

Licensed Under Creative Commons Attribution CC BY

statistically significant. Thus, there is significant reduction in the microhardness of microhybrid composites in group II and group III.

4. Discussion

Hardness is considered as the test parameter as it is an important property for the restorative materials to have long term durability in the oral cavity.^[2] Hardness has also been used to predict the wear resistance of a material and its ability to abrade or be abraded by opposing dental structures and materials.^[8] So decrease in the hardness of a material may result in premature failure of a restoration requiring its replacement. In the present study, all the mouth rinses irrespective of the presence or absence of alcohol resulted in significant reduction in the microhardness of the tested materials compared to baseline values. This may be because of the acidic pH of the mouth rinses which would have caused acid erosion of the restorative materials by acid etching and leaching the principle matrix forming cations.^[9]

Alcohol in mouth rinses is used as solvent, taste enhancer and as an antiseptic agent.^[10] Concern has been expressed regarding the use of alcohol containing mouthrinses as it may soften the tooth coloured restorative. Hence the long-term, regular use of alcohol based mouth rinses like Listerine and Lidocam with higher alcohol content (21.6% w/v and 10% w/v respectively) and low pH may be detrimental to the microhybrid resin composite used in the present study.^[9]

5. Conclusion

Listerine mouth rinse containing highest amount of alcohol showed maximum reduction in micro hardness of microhybrid resin composite.

Lidocam follows Listerine for the reduction in the microhardness of microhybrid composites.

Hiora, which is non alcohol based mouth rinse should be preferably prescribed as it did not show significant reduction in the microhardness of the microhybrid composites.

References

- [1] Shreemoy Dash, Sowmya Kallepalli. An evaluation of the effect of Alcohol and Non-Alcohol based mouth rinses on the microhardness of two esthetic restorative materials – An in vitro Study. *International Journal of Applied Dental Sciences* 2015; 1 (2): 27-31
- [2] Okada K, Tosaki S, Hirota K, Hume WR. Surface hardness change of restorative filling materials in saliva. *Dent Mater.* 2001;17:34–9
- [3] Roulette JF. A materials scientists' view: assessment of wear and marginal integrity. *Quint Int* 1987; 18:543-552.
- [4] Suese K, Kawazoe T. Wear resistance of hybrid composite resin for crown material by the two-body sliding test. *Dent Mater J* 2002; 21:225-237.
- [5] Mckinney JE, Wu W. Chemical softening and wear of dental composites. *J Dent Res* 1985; 64:1326-1331.
- [6] Fischman SL: A clinician's perspective on antimicrobial mouthrinses *Journal of the American Dental Association* 1994; Suppl 2: 205-225.
- [7] Gurgan S, Onen A & Koprulu H. In vitro effects of alcohol containing and alcohol-free mouthrinses on microhardness of some restorative materials. *Journal of Oral Rehabilitation* 1997; 24 (3): 244-246
- [8] Anusavice KL. Mechanical properties of dental materials in phillip's science of dental materials. 10th ed. Philadelphia: WB Saunder's Co. 1996: p. 69.
- [9] Dr. Abhay Kamra, Dr. Amol Zalwar, Dr. Gaurav Tated. Invitro Changes in Microhardness of Nano Filled Resin Composites Due To Use of Mouth Rinses *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)* 2016;15 (7):107-109.
- [10] Overholser CD, Meiller TF, DePaola LG, Minah GE & Niehaus C. Comparative effects of two chemotherapeutic mouthrinses on the development of supragingival dental plaque and gingivitis *Journal of Clinical Periodontology* 1990; 17 (8) 575-579
- [11] Ciancio S. Expanded and future uses of mouthrinses. *Journal of the American Dental Association* 1994; 125 (Supplement 2) 295-325.
- [12] O'Brien WJ. Physical properties of dental materials and their selection. Illinois: Quintessence Publishing Company; 1977. p. 18.
- [13] Kao EC. Influence of food stimulating solvents on resin composites and glass ionomer restorative cement. *Dent Mater.* 1989; 5:201–8.
- [14] Lee SY, Geener EH, Menis DL. Detection of leached moieties from dental composites in fluid simulating food and saliva. *Dent Mater.* 2000;16:33–40.
- [15] Gagari E, Kabana S. Adverse effects of mouth wash use. A review. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1995; 80:432-439