

To Assess the Effect of Mouth Rinses on Surface Microhardness of Bulk-Fill Composite Resin

Ashish Pandey*, Saurabh Dhanraj Yadav, Priyanka Tiwari and Shubham Godhani

Department of Prosthodontics, Daswani Dental College and Research Center, Kota, Rajasthan, India

*Corresponding Author: Ashish Pandey, Head, Department of Prosthodontics, Daswani Dental College and Research Center, Kota, Rajasthan, India.

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Abstract

Background: Resin-based composite (RBC) materials are increasingly being used for the restoration of posterior teeth. The present study was conducted to assess the effect of mouth rinses on surface micro hardness of bulk-fill composite resin.

Materials and Methods: The present study was conducted in the dental department of Daswani dental College, Kota, Rajasthan, India. It comprised of 30 disk-shaped specimens prepared for composite resins. Three mouthwashes such as Listerine, Perioguard and Hexidine were used. Specimens were divided into 3 groups of sub groups. In group I, they were immersed in Listerine, in group II in perioguard and in group III in hexidine. The micro hardness values of the specimens were recorded before and after putting in the various mouth rinses. Microhardness was recorded with the help of Vicker's tester.

Results: Group I had Listerine, group II had Perioguard and group III had Hexidine mouthwashes. Each group had 10 specimens each. The mean microhardness in group I was 59.45, in group II was 59.67 and in group III was 58.14 before immersion. The difference was non- significant ($P > 0.05$). The mean microhardness in group I was 50.12, in group II was 56.24 and in group III was 58.42 after immersion.

Conclusion: All mouthwashes reduced the microhardness of bulk composites. Maximum reduction was seen with Listerine followed by Perioguard and Hexidine.

Keywords: Listerine; Perioguard; Hexidine

Introduction

For the restoration of posterior teeth Resin-based composite (RBC) materials are used. The increasing demand for aesthetic, tooth-coloured and mercury-free restorations has driven a surge in the use of RBC dental materials [1]. With the Minamata Convention in 2013 calling for the phase-out of dental amalgam, and dental schools increasingly teaching RBC techniques, it is likely that the dental profession's reliance upon RBC for the restoration of posterior teeth will increase [2].

In total, 128 countries (including the UK) have signed up to the Minamata Convention to phase down the use of mercury containing dental amalgam. Resin-based composites have been successfully used in dentistry for many years and widely replaced amalgam as a posterior restorations. Dental composites have mechanical properties which are comparable to that of dental tissues which provide a long life of span of teeth. There are many factors which limit the performance of composites.

Due to insufficient depth of cure, incremental placement technique, with a maximum 2 mm thickness, were used for composite restorations. Processing of Dental composite is time consuming. Recently, a new class of resin-based composite, the so called "bulk-fill" composites have been introduced into the dental market with the purpose of time and thus cost savings [4]. The present study was conducted to assess the effect of mouth rinses on surface microhardness of bulk-fill composite resin.

Materials and Methods

The present study was conducted in the dental department of Daswani dental College, Kota, Rajasthan, India. The Study is comprised of 30 disk-shaped specimens (composite resins) by packing the material into custom made cylindrical acrylic ring mold of internal diameter 10 mm and 5 mm height. Each specimen was cured for 40 sec from the upside and another 40 sec from the downside using light cure unit.

Three mouthwashes such as Listerine, Perioguard and Hexidine were used. Specimens were divided into 3 groups of 10 sub group

each. In group I, they were immersed in Listerine, in group II in perioguard and in group III in hexidine. The micro hardness values of the specimen were recorded before and after dipping in the various mouth rinses. Microhardness was measured using Vicker's tester. Results were analyzed statistically.

Results

Table 1 shows that group I had Listerine, group II had Perioguard and group III had Hexidine mouthwashes. Each group had 10 specimens each.

Groups	Group I	Group II	Group III
Mouth wash	Listerine	Perioguard	Hexidine
Number	10	10	10

Table 1: Distribution of specimens.

Graph I: Micro hardness before immersion

Graph I shows that mean microhardness in group I was 59.45, in group II was 59.67 and in group III was 58.14 before immersion. The difference was non-significant ($P > 0.05$).

Graph II: Micro hardness after immersion

Graph II shows that mean microhardness in group I was 50.12, in group II was 56.24 and in group III was 58.42 after immersion. The difference was significant ($P < 0.05$).

Discussion

RBC restorative material have a number of advantages over dental amalgam including improved aesthetics. RBCs allow for a conservative cavity preparation and are adhesively bonded to the tooth with a compatible bonding system. Studies are increasingly supporting the longevity of RBC as a material for restoring both Class I and II cavities [5]. The placement of posterior RBC

restorations, however, is not without its limitations. Proper isolation of the tooth is required and an incremental layering technique is currently recommended. The layering of RBC improves light penetration allowing for complete polymerization of the material and is thought to reduce overall polymerization shrinkage stresses on the tooth [6].

In order to simplify and speed-up the placement of large posterior RBCs, manufacturers have produced a range of RBC materials which can be placed in single or deeper increments, known as bulk-fill RBCs. Over a relatively short period of time many bulk-fill composite resins have been marketed quoting increment depths between 4–10 mm. The placement of these larger increments of RBC may reduce the time needed when placing posterior RBCs and thereby reduce technique sensitivity [7]. The present study was

conducted to assess the effect of mouth rinses on surface microhardness of bulk-fill composite resin.

In this study group I had Listerine, group II had Perioguard and group III had Hexidine mouth washes. Each group had 10 specimens each.

Dhingra, et al. [8] has found that Sonic fill resin composite prior to immersion showed no significant difference in mean hardness value between groups 1 (Listerine), 2 (Periogard), 3 (Provicidal), 4 (Hexidine), 5 (Hexidine Ep) and 6 (Hiora). Therefore, the null hypothesis all the mouth rinses irrespective of the presence or absence of alcohol reduced the micro hardness of Bulk filled resin composite.

We found that mean microhardness in group I was 59.45, in group II was 59.67 and in group III was 58.14 before immersion. The difference was non-significant ($P > 0.05$). The mean microhardness in group I was 50.12, in group II was 56.24 and in group III was 58.42 after immersion.

The light-cured flowable (low viscosity) materials have been termed bulk-fill bases because they always require a conventional layer of RBC to cap the restoration because of its properties like hardness and low resistance to wear. The market is flooded with majority of bulk-fill materials than dual-cure materials. Manufacturers have attempted to increase the depth of cure by a variety of methods including reducing the filler content, increasing filler particle size and the use of additional photo-initiators [9].

Conclusion

Authors found all mouthwashes reduced the microhardness of bulk composites. Maximum reduction was seen with Listerine followed by Perioguard and Hexidine.

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