The effect of cyclic immersion in cola drinks on the surface microhardness and surface roughness of different composite resin filling materials

(In vitro study)

A thesis Submitted to the council of College of Dentistry, University of Baghdad
In Partial Fulfillment of the Requirements for the Degree of
Master of Science in Conservative Dentistry

Prepared by

Ali Sa'ad Abu-Naila

B.D.S. H.D.D.

Supervised by

Prof. Dr. Luma M. Baban

2010   **1431**

Abstract

This study was conducted to evaluate the effect of two types of cola drinks (Regular and Diet) on the surface microhardness and surface roughness of three types of composite resins; Filtek P60 (Packable composite), Tetric-N-Ceram (Nanohybrid composite) and Swisstec (Conventional composite) in which composite samples were alternately immersed manually, 5 seconds each, in cola drink and artificial saliva for 10 cycles at room temperature which repeated three times a day (8am,4pm,12am) at 8hours intervals for one week.

Total numbers of (180) samples were prepared, (60) samples for each type of composite, were divided into two main groups (30) subjected for microhardness test (by Vickers hardness tester) and (30) subjected to surface roughness test (by profilometer).

For each type of composite resin group the (30) samples were subdivided as follows:-

Group (1): Ten samples were immersed in regular Pepsi cola.

Group (2): Ten samples were immersed in diet Pepsi cola drink.

Group (3): Ten samples were immersed in artificial saliva.

The results revealed that cola drinks showed reduction in means VHN (Vickers hardness number) values and increasing in means Ra (Roughness average) values for all types of composites for all groups.

Filtek P60 (packable) composite resin had the highest VHN values followed by Tetric-n-Ceram (nanohybrid) composite and Swisstec (conventional) composite respectively.

Surface microhardness results showed that cola drinks affect the Filtek P60 (packable) composite resin significantly while there effect was with high significant difference for Swisstec (conventional) composite and Tetric-n-Ceram (nanohybrid) composite resin, so the influence of cola drinks was material dependent.

Diet Pepsi cola showed reduction in means VHN values and increasing in means of Ra values for all types of composites for all groups more than regular Pepsi cola.

The neutralisable acidity results revealed that regular Pepsi need lesser amount of NaOH to reach the neutrality than diet Pepsi in spite of the acidity of regular Pepsi is more than diet Pepsi.

Tetric-n-Ceram (nanohybrid) composite had the lowest (Ra) values (lowest roughness) followed by Filtek P60 (packable) composite and Swisstec (conventional) composite respectively.

Surface roughness results showed that Filtek P60 (packable) composite resin affected non significantly in regular Pepsi and significantly in diet Pepsi, while Tetric-n-Ceram (nanohybrid) composite and Swisstec (conventional) composite showed a high significant difference in both cola drinks, so the influence of cola drinks was material dependent.

All types of composites tested in this study showed reduction in VHN values and increasing in means of Ra values after 7 days of immersion in artificial saliva, but the effect was a non significant.