SDM
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Dental Sciences
& Hospital

"AN INVITRO STUDY TO EVALUATE THE EFFECT OF ACIDIC BEVERAGES ON SURFACE ROUGHNESS AND MICROHARDNESS OF TWO DIFFERENT ALL CERAMIC RESTORATIVE MATERIALS"

By

Dr. ASHISH R GUPTA

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Dr. LEKHA K

PROFESSOR

HEAD OF DEPARTMENT

DEPARTMENT OF PROSTHODONTICS
S.D.M. COLLEGE OF DENTAL SCIENCES & HOSPITAL,
DHARWAD

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Rajiv Gandhi University of Heath

Sciences, Bangalore, Karnataka

ABSTRACT

Introduction: Dental ceramics are widely used for constructing crowns, inlay, laminates, veneers and many fixed restorations[1,2]. They are extensively used because of their high aesthetic properties and wear resistance[3].Clinical success of dental ceramics is affected by its roughness which in turn affects their strength. Long term evaluation should be carried out for dental ceramics. Chemical degradation due to acidic environment in oral cavity leads to roughness of dental ceramics thereby attraction of plaque in that area[4]. It causes them to weaken internally. Dental erosion is caused to patients who are habitually consuming citric fruits or juices or drinks containing CO_2 [5]. Oral cavity is generally exposed to various dietary agents and abrasives during a lifetime. These agents include ingredients that are acidic in nature that etches the surface of tooth and restoration. Based on the routine and food habits there are extensive changes in diet of people with liquid refreshment being a part of this changing lifestyle. Habits indulging in consuming carbonated aerated water and beverages are one side of this change. Consuming fruit juices containing citric acid as a part of health drinks is another causative factor. In this process, the oral cavity is exposed to various dietary acids which results in dental erosion. Erosion can develop surface roughness, which is correlated with microbial plaque retention, enamel wear, and material strength. Enamel is the hardest structure in the body which is susceptible to demineralization when it is exposed to these eatables. It causes dissolution of the apatite crystals leading to severe or total destruction of the tooth structure. Zirconia and E max are used to fabricate crowns, veneers and fixed prosthesis. Zirconia offers best mechanical properties unlike any other dental ceramic, bringing to realization reliable and non-metal posterior fixed partial dentures with a substantial reduction in core thickness[6].

Objectives:

1) To evaluate the surface roughness and micro hardness of E max when exposed to continuous acidic environment.

2) To evaluate the surface roughness and micro hardness of zirconia when exposed to continuous acidic environment.

3) To correlate surface roughness and micro hardness between E max and zirconia.

Methodology:

In this study two all ceramic material will be selected. A total of 48 disk specimens (12mm in diameter and 2 mm in thickness) will be divided into two groups. Group A consist of E max and Group B consist of zirconia, which will further be subdivided into Group 1 (lime juice), Group 2 (coca cola) and Group 3 (real fruit juice). Surface roughness of the specimens will be measured by a profilometer before immersion in five different positions (1.5mm apart). All samples will be immersed vertically in different acidic medium for 168 hours at 37°C. The surface roughness of each specimen will be measured using profilometer in five different positions (1.5mm apart).A diamond stylus will be moved vertically in contact with the sample and then moved laterally across the sample for a specified distance and specified contact force.[1] Micro hardness will be tested using Vickers hardness test.

Data will be analyzed by two way analysis of variance followed by post hoc analysis.

1. Commercially available E max and zirconia.
2. The surface roughness and micro hardness of ceramic will be tested using profilometer and Vickers hardness test respectively.

Results: In our study, E max and Zirconia discs immersed in lime juice showed maximum surface roughness while discs in real mixed fruit juice showed the least. The reduction of Surface hardness of E max and Zirconia discs was maximum when immersed in Lime juice and least for Real mixed fruit juice. The order of sequence in affecting the surface roughness in descending order was Lime juice >coca cola>real mixed fruit juice.

Conclusion: Within limitations of this study, it can be concluded that, when comparison of surface roughness and hardness between treated E max and zirconia discs was done, it was found that both were affected maximum by lime juice but zirconia was slightly resistant in comparison to E max . The order of sequence in affecting the surface roughness in descending order was Lime juice >coca cola>real mixed fruit juice.

Keywords : Zirconia , E max , Lime juice , Coca cola , Real mixed fruit juice.