

In Vitro Study of the Effect of Tooth-brushing on Surface Roughness of two different types of Composite Resin

Thesis

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Summary and Conclusions:

Surface roughness of restorative materials is a very complex phenomenon that is affected by several extrinsic and intrinsic factors. Roughness of restorative materials in the oral environment results from direct contact between tooth and the restoration during mastication, oral parafunctions, as well as toothbrushing .

The purpose of this study was to evaluate and compare the surface roughness of two resin composite restoratives under simulated tooth brushing machine with different brushing cycles and different types of tooth bristles.

A total of 120 specimens of two different types of light curing resin composite restoratives; (Methacrylate composite, ALPHA-DENT[®] and Silorane based composite Filtik P90) were made for this study. The specimens were made in the form of cylindrical disks, A mylar strip and a glass slide was placed over the resin composite. The specimens were light cured with light curing unit at $400-500 \text{ mw/cm}^2$, a major group of 60 specimens of each material were randomly divided into two minor subgroups (30 specimens) in each group according to the type of toothbrush bristle used in the study: (soft bristle & Medium bristle). Then these subgroups were divided again to three smaller subgroups according to the time of brushing, (10 specimens) (5 min, 10min, 15min).

Every specimen was measured for the detection of the average pre-brushing surface roughness (Ra1) and the results

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ^١ الرَّحْمَنِ الرَّحِيمِ^٢
مَلِكِ يَوْمِ الدِّينِ^٣ إِيَّاكَ نَعْبُدُ وَإِيَّاكَ نَسْتَعِينُ^٤
اهْدِنَا الصِّرَاطَ الْمُسْتَقِيمَ^٥ الصِّرَاطَ الَّذِينَ أَنْعَمْتَ
عَلَيْهِمْ^٦ غَيْرِ الْمَغْضُوبِ عَلَيْهِمْ وَلَا الضَّالِّينَ^٧

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Introduction

INTRODUCTION

Resin based restoratives are increasingly being used in dentistry, and the continual development of materials has made a variety of tooth colored composites available for clinical use^(25,26). These present a wide range of organic and inorganic components that may affect both their handling characteristics and properties. The long term clinical service of composite filling depends on their physical characteristics. One of the most important properties is the ability to withstand wear, as any loss of substance could result in altering the anatomic shape and affect the performance of the restoration^(27,31,32).

Although, clinicians tend to concentrate on occlusal wear, some researchers have demonstrated that the abrasion forces produced by oral hygiene methods can adversely affect the surface characteristics of restoratives^(53,62).

An increase in surface roughness of material used in the oral environment has many consequences. A rougher surface texture can lead to decreased gloss and discoloration or staining of the material surface, both of which affect the esthetic quality of restorations^(37,54,59). Furthermore, it may also lead to the accumulation of dental plaque, leading to secondary caries and periodontitis. Therefore ideal to obtain composite restorations with smooth surfaces that do not deteriorate over the course of time. Smooth highly polished restorations have been shown to be more esthetic and more easily maintained than restorations with rougher surfaces^(73,75).

Studies that evaluated the effect of toothbrushing on the deterioration of composite resin materials for direct and indirect use showed a rapid increase in surface roughness and found differences between the materials^(21,32,56,57,77,88). As different parameters (number of strokes, load, toothpaste) were used in the studies, the results can hardly be compared.

The evaluation of the deterioration capacity by simulated toothbrushing in vitro might be a surrogate parameter to assess the ability of a material to maintain its gloss and smoothness and prevent staining of the material. Based on this, the study will be conducted.