Fiber glass reinforced composite for CAD CAM

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Introduction

In the last three decades, exciting new developments in dental materials and computer science have led to the success of contemporary dental computer-aided design - computer-aided manufacturing (CAD-CAM) technology. Each year, new materials appear with improved properties and qualities. The objective of the work was to develop a new cad cam milling material using fiber glass reinforced composite.

Materials and method

A selection of 2 different types of resins (R1 composed from 25%Bis-GMA, 40%UEDMA, 35%DMTENG and R2 composed from 65%Bis-GMA, 35% DMTENG) with 2 different types of hybrid filler (F1 with 42% quartz, 42% radiopaque glass and 16% hydroxyapatite and F2 with 90% quartz and 10% colloidal silica) and 3 different types of E type fiber glass geometries (veil 30g/m2, twill 163g/m2 and stratimat 300g/m2) in 4, 6, 8 and 10 layers were used in this in vitro study. Inside of a silicon cube of 1 cm side, layers of resin and fiber glass were placed one above another. After each layer a light curing process of 10 seconds was done in 5 different points. 2 mm thick samples were cut with a precision saw (Isomet 1000, Buehler, USA) and investigated with SEM and Raman spectroscopy. Data were analyzed with dedicated software.

Results

Raman analysis showed a powerful interaction between the polymer and the fiber glass. SEM data revealed that the different fiber glass geometries were well incorporated inside the resin, resulting an acceptable homogeneity.

Conclusions

Within the limitation of this study, it seems that it is possible to achieve a fiber glass reinforced composite for the use of CAD CAM technology. Further investigation must be done in order to test all the properties of the new material.

Key words: CAD CAM, composite, fiber glass

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Figure 1. CAD-CAM restorative materials.

Figure 2. SEM images of fiber glass-reinforced composite a) FRC1; b) FRC2; c) FRC3; d) FRC4

Figure 3. Evolution of the homogeneity

Figure 4. Different E type fiber glass geometries

Figure 5. Raman shifts versus energy measured on the fiber of YM material on the 5 classes of PRC materials

Figure 6. E type fiber glass geometries

Figure 7. Evolution of the homogeneity

Figure 8. Different E type fiber glass geometries

Figure 9. Raman spectra tracings measured on the type of YM composite on the 5 classes of PRC materials
Lip Repositioning: An Alternative to Invasive Surgery
A 3 Year Follow Up Case Report

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Introduction
Causes of Excessive Gingival Display (EGD) could be classified to intra-oral (reflected passive eruption, gingival hyperplasia, compensatory over-eversion with attrition, anterior dental/occlusal extrusion with deep bite) and Extra-oral (vertical maxillary excess, short upper lip, hyperactive upper lip) [1,14].

Objectives
This case illustrates the preparatory steps to reach the diagnosis with the corresponding surgical technique used for managing this case as a minimally invasive alternative to orthognathic surgery.

Case Description
During the first visit, the chief complaint was:
"I am not happy with my smile especially when I laugh and I don’t want to go to the OI to fix this problem"

Preparatory steps:
Photos, X-rays and Measurements

Surgical steps:
* Measurements, Outline, Superficial Incision And Sutures
* Post Operative inst. And Follow up.

Results
2 weeks Postop.
1 Year Postop.
3 Years Postop.

Figure (3): Post Operative Results for up to three Years.

Discussion
The technique was originally described as a cosmetic surgery by Rubinstein and Kasdanovsky [1] in 1973, has been introduced to the dental field at 2006 by Rosenblatt and Simon and the latest guidelines are put in 2015 by Bhola and his group, Indicated with mild to moderate VME cases and Hyperactive upper lip cases. Contra-Indicated with severe VME cases and with the presence of limited KAG. Gives 75% to 80% improvement in difficult cases and up to 100% relatively simple cases. Variance has and many modifications and it also can be easily reversed or repeated.
The main disadvantage is relapse. Relapse is seen during the first 6 to 8 weeks

Conclusion
Gummy smile is a multifactorial condition that needs careful examination to detect the causative etiology/etiologies and it needs a collaborative multiple treatment modality approach.
Lip repositioning is an innovative predictable technique used with selective cases either as an adjunctive or as an alternative technique since it provides minimal morbidity, lower incidence of complications and faster recovery time

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References
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