

Pengaruh in-home bleaching agent terhadap kekasaran permukaan resin komposit nanofilled dan microhybrid = Effect of in-home bleaching agent on the surface roughness of nanofilled and microhybrid composite resin

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Abstrak

Latar Belakang: Bleaching merupakan prosedur mencerahkan warna gigi dengan bantuan bahan kimia yang memiliki efek samping berupa perubahan pada permukaan material resin komposit. Sementara itu, kekasaran permukaan memainkan peran penting dalam penentuan interaksi material restorasi dengan lingkungan rongga mulut karena tekstur permukaan yang tidak baik dapat meningkatkan retensi akumulasi plak dan dapat menimbulkan penyakit lainnya. Namun, penelitian mengenai efek bleaching agent pada kekasaran permukaan melaporkan hasil yang kontroversial. Tujuan: Penelitian ini bertujuan untuk menganalisis pengaruh in-home bleaching agent terhadap kekasaran permukaan resin komposit nanofilled dan microhybrid. Metode: Resin komposit nanofilled FiltekTM Z350 XT Universal Restorative (3M ESPE) dan resin komposit microhybrid FiltekTM Z250 Universal Restorative (3M ESPE) digunakan pada penelitian ini. Sebanyak 16 spesimen disiapkan dari masing-masing jenis resin komposit yang dinyatakan oleh kelompok A resin komposit nanohybrid dan kelompok B resin komposit microhybrid (jumlah total spesimen adalah 32). Seluruh spesimen dibuat dengan penempatan material ke dalam mould dengan diameter 6 mm dan ketebalan 2 mm menggunakan kaca preparat dengan strip seluloid kemudian diberikan beban 500 gram. In-home bleaching agent (Opalescence Tooth Whitening Systems 10% Carbamide Peroxide Concentrations) diaplikasikan selama 8-10 jam/hari. Seluruh perlakuan dilakukan pada suhu 37°C dan in-home bleaching agent dibilas setiap hari selama 1 minggu dan disimpan dalam air saline steril selama periode hiatus. Kemudian, seluruh spesimen diuji dan dicatat nilai kekasaran permukaan (Ra) dalam satuan m dengan menggunakan alat uji surface roughness tester (Surtronic® S-128) sebelum dan sesudah perlakuan. Data dianalisis secara statistik dengan uji Paired T-Test dan Independent T-Test. Hasil: Terdapat perbedaan bermakna antara kekasaran permukaan resin komposit nanofilled dan microhybrid sebelum dan sesudah aplikasi in-home bleaching agent ($p < 0,005$). Terdapat perbedaan bermakna antara resin komposit nanofilled dan microhybrid sesudah aplikasi in-home bleaching agent ($p < 0,005$). Kesimpulan: In-home bleaching agent secara signifikan meningkatkan nilai kekasaran permukaan pada kedua jenis material resin komposit dengan resin komposit nanofilled lebih rendah dari resin komposit microhybrid. Kekasaran permukaan pada kedua jenis resin komposit masih dapat diterima secara klinis karena menunjukkan nilai di bawah ambang batas kritis 0,2 m.

.....Background: Bleaching is a procedure that involves lightening the color of a tooth through the application of a chemical agent, which has a side effect in the form of changes to the surface of the composite resin material. Meanwhile, surface roughness plays a vital role in determining a material's interaction with the oral environment due to the poor surface texture of dental materials. It has a significant influence on plaque accumulation and causes other diseases. However, studies on the effect of bleaching agents on the surface roughness of dental materials have reported controversial results. Objectives: This study aimed to analyze the effect of in-home bleaching agents on the surface roughness of nanofilled and

microhybrid composite resin. Methods: Nanofilled composite resin Filtek™ Z350 XT Universal Restorative (3M ESPE) and microhybrid composite resin Filtek™ Z250 Universal Restorative (3M ESPE) were used in the present study. Sixteen specimens were prepared from each type of composite resin that represented by group A for nanofilled composite resin and group B for microhybrid composite resin (total number of specimens were 32). Each specimen was prepared by compressing a sufficient amount of material into a mold of 6 mm in diameter and 2 mm in thickness using glass slides with celluloid strip, then given a load of 500 grams. In-home bleaching agents (Opalescence Tooth Whitening Systems 10% Carbamide Peroxide Concentrations) were applied 8-10 hours/day. All treatment was conducted at 37°C temperature, and an in-home bleaching agent was applied and rinsed off daily for one week and stored in distilled water during the hiatus period. Then, the surface roughness of all specimens was measured and recorded (Ra) value in μm using a surface roughness tester (Surtronic® S-128) before and after being treated. Data were statistically analyzed with Paired T-Test and Independent T-Test. Result: There was a statistically significant difference between the surface roughness of nanofilled and microhybrid composite resin before and after being bleached with an in-home bleaching agent ($p < 0,005$). There was a statistically significant difference between nanofilled and microhybrid composite resin after being bleached with an in-home bleaching agent ($p < 0,005$). Conclusion: In-home bleaching agent significantly increased the surface roughness value of both types of composite resin with nanofilled composite resin is lower than microhybrid composite resin. Surface roughness for both composite resins is still clinically acceptable because values tested below the critical threshold of 0,2 μm .