

## INTISARI

Bahan *bleaching*  $H_2O_2$  menghasilkan radikal bebas hidroksil ( $HO\bullet$ ), perhidroksil ( $HOO\bullet$ ),  $O_n$  ( $O\bullet$ ), anion perhidroksil ( $HOO^-$ ) dan anion superoksida ( $OO^-$ ). Pasca *bleaching*, residu radikal bebas di tubuli dentin tetap aktif dalam jangka waktu tertentu, sehingga proses demineralisasi dan denaturasi terus berlanjut. Residu radikal bebas juga mengganggu polimerisasi restorasi resin komposit pasca *bleaching*. Sodium askorbat adalah antioksidan yang ditengarai mampu mengikat radikal bebas. Penelitian ini bertujuan untuk menguji pengaruh aplikasi sodium askorbat 35% pascaperawatan *bleaching* dengan hidrogen peroksida 35% terhadap kualitas dentin yang meliputi kandungan kalsium dan fosfor, struktur permukaan, kekerasan mikro dentin dan pelekatan restorasi resin komposit.

Pengujian kualitas dentin menggunakan 6 gigi premolar, bagian mahkota dipotong menjadi 4 bagian, sehingga diperoleh 24 subjek penelitian, kemudian diamati kandungan kalsium, fosfor dan struktur permukaan dentin dengan SEM-EDX. Subjek penelitian diaplikasi hidrogen peroksida 35%, 2x 120 jam selanjutnya dibagi 4 kelompok perlakuan: kelompok A tanpa aplikasi sodium askorbat, direndam saliva buatan 7 hari; kelompok B diaplikasi sodium askorbat 35% satu kali; kelompok C diaplikasi sodium askorbat 35% dua kali; kelompok D diaplikasi sodium askorbat 35% tiga kali. Kandungan kalsium, fosfor dan struktur permukaan dentin diamati kembali menggunakan SEM-EDX, dilanjutkan uji kekerasan mikro dentin menggunakan *Vickers Microhardness Tester*. Pengujian kekuatan geser pelekatan resin komposit menggunakan 9 gigi premolar, dipotong menjadi 36 subjek penelitian, diaplikasi hidrogen peroksida 35%, dibagi 4 kelompok perlakuan dengan prosedur yang sama seperti di atas, kemudian ditumpat dengan resin komposit. Kekuatan geser pelekatan resin komposit diuji dengan *Universal Testing Machine*. Data dianalisis dengan ANAVA satu jalur dilanjutkan uji LSD.

Analisis ANAVA menunjukkan bahwa penurunan kalsium dan kekuatan geser pelekatan pada keempat kelompok perlakuan berbeda bermakna ( $p < 0,05$ ). Penurunan fosfor dan kekerasan mikro dentin pada keempat kelompok perlakuan tidak berbeda ( $p > 0,05$ ). Penurunan kalsium kelompok C dan D lebih rendah dibanding kelompok A dan B. Kekuatan geser pelekatan resin komposit kelompok C dan D lebih tinggi dibanding kelompok A dan B. Penurunan kalsium dan kekuatan geser pelekatan resin komposit sama antara kelompok A dengan B, antara kelompok C dengan D. Penelitian ini menunjukkan aplikasi sodium askorbat 35% sebanyak 2 kali mampu menghambat demineralisasi lebih lanjut dan meningkatkan kekuatan geser pelekatan resin komposit pada dentin pasca *bleaching* dengan hidrogen peroksida 35%.

**Kata kunci:** *Bleaching*, sodium askorbat 35%, kalsium dan fosfor, struktur permukaan, kekerasan mikro, kekuatan geser

## ABSTRACT

The bleaching material  $H_2O_2$  produces free radicals hydroxyl ( $HO\bullet$ ), perhydroxyl ( $HOO\bullet$ ),  $On(O\bullet)$ , perhydroxyl anion ( $HOO^-$ ) and superoxide anion ( $OO^-$ ). Post bleaching procedures produce free radical residues in dentin tubules that remain active for a period of time and may cause demineralization and denaturation of the tooth. Free radical residues may interfere the polymerization of composite resins. Sodium ascorbate is an antioxidant that is suspected to react with free radicals. This study aims to examine the effect of application of 35% sodium ascorbate on the dentin quality including the content of calcium and phosphor, dentin surface structure, micro hardness and shear bond of composite resin restorations in bleached dentin by 35% hydrogen peroxide.

Testing of dentin quality used 6 premolars, with the crown being cut into four equal part to obtain 24 samples. The content of calcium and phosphor, and dentin surface structure were observed by SEM-EDX. The samples were applied by 35% hydrogen peroxide for 2x 120 hours then divided into 4 groups: group A was without application of sodium ascorbate, soaked in saliva for 7 days; group B was once applied by 35% sodium ascorbate; group C was twice applied by 35% sodium ascorbate; group D was three times applied by 35% sodium ascorbate. The content of calcium and phosphor, dentin surface structures were re-observed by SEM-EDX, followed by dentin microhardness test by Vickers Microhardness Tester. The test of shear bond strength of composite resin using 9 premolars, were cut into 36 samples, applied by 35% hydrogen peroxide, divided by 4 groups with the same procedure, then was subjected to composite resin restoration. The shear bond strength of composite resin was tested by Universal Testing Machine. Data was analyzed by one-way ANOVA followed by LSD test.

The results showed that the decrease of calcium and shear bond strength of composite resin were different in the four treatment groups ( $p < 0,05$ ). There was no difference in the decrease of phosphor and dentin microhardness in the four treatment group ( $p > 0,05$ ). The decreased of calcium in groups C and D was lower than those in groups A and B. The shear bond strength of composite resin in group C and D were higher than in groups A and B. The decrease of calcium and shear bond strength of composite resin were similar between group A with B, between group C and D. This study showed that twice application of 35% sodium ascorbat stop demineralization and increased shear bond strength of composite resin in bleached dentin by 35% hydrogen peroxide.

**Keywords:** Bleaching, 35% sodium ascorbate, calcium and phosphor content, surface structure, microhardness, shear bond