The impact of the maturation and protective coating on the discoloration of the restorative materials

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AIM

The aim of the study was to determine the impact of the degree of maturation and protective coating on the discoloration of glass ionomer-based materials after cyclic exposure to green tea.

MATERIALS AND METHODS

The materials tested were high-viscosity glass ionomer Ketac Universal Aplicap (Ketac) and glass-hybrid material Equia Forte HT Fil (Equia). Samples were divided into eight experimental groups — each material in both non-matured and matured forms, with and without the protective coating: 1. Ketac; 2. Ketac+Coat: 3. Equia; 4. Equia+Coat; 5. KetacMatured; 6. KetacMatured+Coat; 7. EquiaMatured; 8. EquiaMatured+Coat. Ketac samples in groups 2 and 6 were protected with Scotchbond Universal (3M ESPE). Equia smaples in grpups 4 and 8 were coated with Equia Coat (GC). L* a* b* components within the CIELAB system were recorded using a spectrophotometer, before and after cyclic exposure to green tea, 3 times a day for 10 minutes, for 14 days. Changes in color (ΔE) were calculated for each sample. Test distribution was normal (Kolmogoriv Smirnov, $p>0.05$). Differences between groups were tested using one-way ANOVA and post hoc Scheffe at the significance level $\alpha=0.05$.

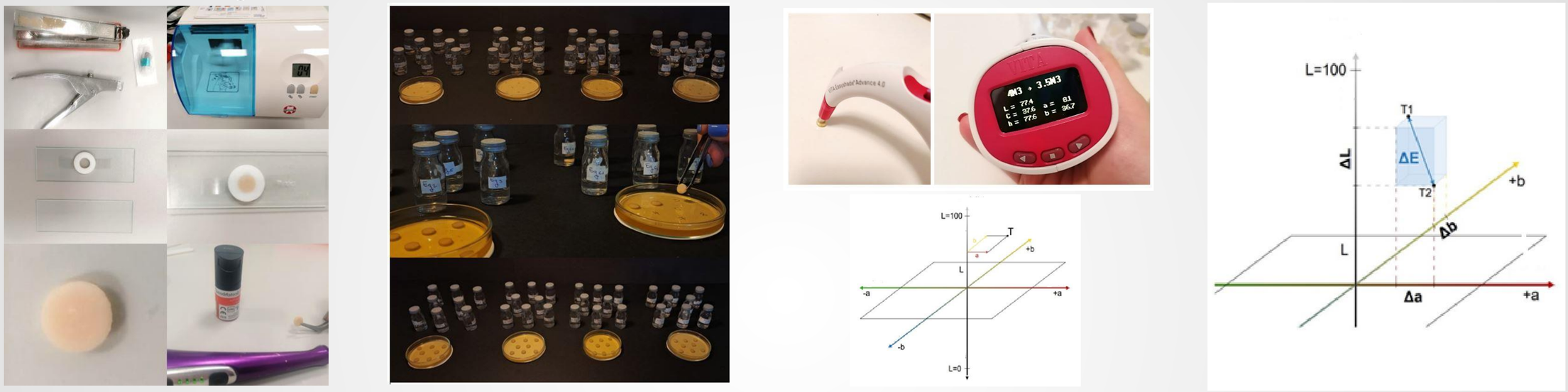

Figure 1. Preparation of samples, cyclic exposure to discoloring agent, recording of L* a* b* color components within the CIELAB system using a spectrophotometer and calculation of ΔE.

RESULTS

In Ketac groups, color change was the smallest in KetacMatured (ΔE=2.108±0.336), and the highest in Ketac (ΔE=2.7±0.666), but the difference between the groups was not significant ($p>0.05$). In Equia groups ΔE was the smallest in EquiaMatured+Coat (ΔE=1.175±0.272) and it was significantly lower than in all other Equia groups ($p<0.05$). Color change was highest in Equia (ΔE=4.887±1.119) and EquiaMatured (ΔE=4.835±0.817) and it was significantly higher than in all other Ketac and Equia groups ($p>0.05$).

GROUP	N	MEAN ΔE	SD	SD error
Ketac	8	2,700133	0,665933	0,235443
Ketac+Coat	8	2,206256	0,580574	0,205264
Equia	8	4,887252	1,118553	0,395468
Equia+Coat	8	2,650853	0,640737	0,226535
KetacMatured	8	2,107779	0,33555	0,118635
KetacMatured+Coat	8	2,482427	0,669805	0,236812
EquiaMatured	8	4,834712	0,817182	0,288918
EquiaMatured+Coat	8	1,17541	0,271841	0,09611

Figure 2. Descriptive statistics of color change (ΔE) among unmatured and matured Ketac Molar and Equia groups.

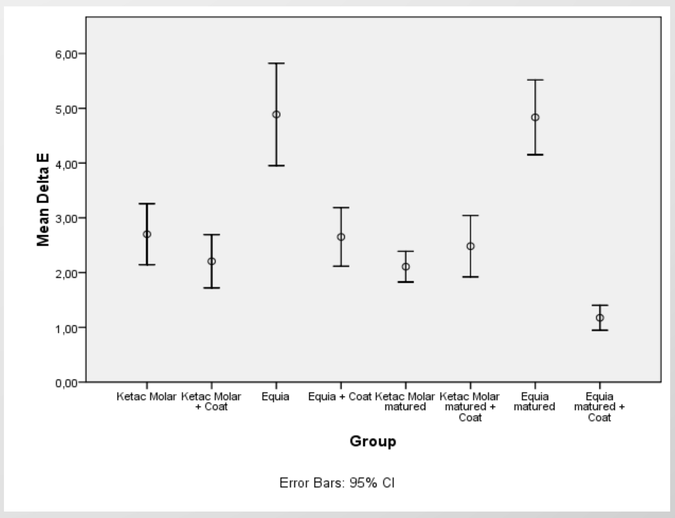

Figure 3. Mean change in color in eight groups of samples.

CONCLUSIONS

Ketac groups with matured and coated samples exhibited less color change, but the effect of maturation and coating was not significant. In glass hybrid material, matured and coated samples resulted in superior color stability. The effect of coating on color stability in Equia was significant, but the effect of maturation was not significant.

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