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BIS-ACRYL RESIN COLOR EVALUATION BEFORE AND AFTER SURFACE TREATMENTS AND IMMERSION IN COLORING BEVERAGES

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ABSTRACT

This study evaluated the color stability of a bis-acryl composite resin (specimens - disks) submitted to different surface treatments and diverse time immersion in coloring beverages. To obtain the coordinates L*a*b*, the disks were measured in a spectrophotometer before immersion (T0), after 7 (T1) and 20 days (T2). The color differences (ΔE_{ab}) obtained for all the experimental groups were analyzed with the ANOVA, and multiple comparisons were performed by the Tukey HSD test (α=0.05). Regardless the bis-acryl composite resin surface treatment, the excessive administration of coffee always promotes the resin pigmentation.

Keywords: provisional prostheses, bis-acryl composite resin, color, colorants.

INTRODUCTION

Recently, the bis-acryl composite resin has been used to make provisional restorations, since it presents a lower contraction of polymerization and reduced exotherm when compared with acrylic resins (Givens *et al*., 2008). In addition, bis-acryl resins are easy to handle, have a polishing facility, and can be used for short and long periods (Rutkunas *et al*., 2010). However, the probability of staining during clinical use is a major clinical problem, since it even led to a frequent provisional prostheses replacement (Bayindir *et al*., 2012). This feature may be associated to different factors, such as coloring agents, intrinsic characteristics of the material and polishing capability (Rutkunas and Sabaliauskas, 2009).

Thirty bis-acryl composite resin discs (12mm diameter and 3mm thickness) (Color A2, Protemp 4®, 3M Espe, USA) were performed and divided into three groups. Ten disks (G1) were cleaned with gauze soaked in alcohol, according to the manufacturer's instructions; ten disks (G2) were cleaned the same way, and after, they were finished with abrasive disks (Praxis®, TDV Dental, Brazil); and to the other remaining disks (G3) was given the same finishing G2 protocol, followed by rubberized spiral disk (Soflex®, 3M ESPE, USA) and diamond paste (Diamond AC I and II, FGM®, Brazil). Five disks of each group were immersed in coffee-based solutions (Nescafé®, Nestlé Brazil, Brazil) and cola-based soft drink (Coca-Cola®, Coca-Cola Company, USA) for 7 and 20 days. The color of the disks was measured by a spectrophotometer (Minolta CM 3600A, Konica Minolta®, Japan) before immersion (T0), and after 7 (T1) and 20 days (T2). For the measurement, the excluded component (SCE) and the illuminant D65 were considered. The color differences (ΔE_{ab}) were

calculated by CIELab System, comparing the L*a*b* coordinates of the experimental groups with the standard color reference of the bis-acryl resin employed. Statistical analysis was made by one and two-way ANOVA, and multiple comparisons were performed by the Tukey HSD test (α=0.05).

RESULTS AND CONCLUSIONS

The L*a*b* coordinates of the experimental groups are shown in Table 1. Table 2 shows the mean of the color differences (ΔE_{ab}) for the coloring beverages employed in this study.

The largest color differences were found when disks were immersed in coffee for 20 days (P<0,001). The Tukey HSD test showed that the behavior of the three groups immersed in coffee for 20 days (T2) was similar (α=0.05). When the disks were immersed in cola-based soft drink, the color differences found (between 1.65 and 3.06ΔE_{ab}) did not showed significant differences between groups (P=0.010) or immersion times (P=0.026).

Table 1 - Mean of the measurements for the bis-acryl resin disks (G1, G2 and G3) for the two colorants (coffee and cola), in the different time condition (T0, T1 and T2).

	Groups	**G1**			**G2**			**G3**		
	Coffee	**L***	**a***	**b***	**L***	**a***	**b***	**L***	**a***	**b***
T0	Mean	71.03	-4.61	8.33	71.90	-4.31	8.33	71.90	-4.51	8.46
T1	Mean	67.42	-4.50	21.33	69.12	-4.44	17.06	69.04	4.29	18.64
T3	Mean	62.69	-2.21	27.52	63.96	-1.91	24.97	63.79	-1.89	26.53
	Cola	**L***	**a***	**b***	**L***	**a***	**b***	**L***	**a***	**b***
T0	Mean	70.50	-4.50	7.96	71.67	-4.30	8.21	71.35	-4.67	8.06
T1	Mean	70.38	-4.69	8.74	71.79	-4.45	9.12	71.34	-4.69	8.17
T2	Mean	70.46	-4.82	9.28	71.90	-4.65	9.41	71.32	-4.76	8.50

Table 2 - Mean of color differences (ΔE_{ab}) obtained for the different surface treatments and immersion time.

Colorants	**Time**	**G1 - ΔE_{ab}**	**G2 - ΔE_{ab}**	**G3 - ΔE_{ab}**
Coffee	**T0**	2.04	1.85	2.13
	T1	15.28	10.73	12.27
	T2	22.92	20.14	21.63
Cola	**T0**	2.02	1.74	2.13
	T1	2.72	2.45	1.65
	T2	3.06	2.71	1.96

This study shows that the excessive coffee exposure may stain provisional prostheses made of bis-acryl composite resins, regardless of the surface treatment used.

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