



INFLUENCE OF DENTAL PROPHYLAXIS IN TOOTH COLOR L*a*b* VALUES

PEREIRA R.¹, SILVEIRA J.², DIAS S.¹, CARDOSO A.¹, MATA A.², MARQUES D.²

¹ GIBBO, Faculty of Dental Medicine, Universidade de Lisboa

² GIBBO-LIBPhys FCT UID/FIS/04559/2013, Faculty of Dental Medicine, Universidade de Lisboa



INTRODUCTION & OBJECTIVE

A harmonious and beautiful smile is considered a major esthetic attribute with patient's aesthetic demands increasing over the last years^(1,2). Among the main factors that influence smile perception, tooth color is one of them⁽³⁾.

Tooth color perception can also be influenced by the presence of extrinsic stain derived mainly from food and tobacco smoke, which is removable by means of professional dental prophylaxis. Between routine dental appointments, extrinsic stain could interfere in the assessment of tooth color, which could be relevant for the patient self-perception or even interfere with the results of a bleaching or restorative treatment⁽⁴⁻⁵⁾.

The present clinical diagnostic study aims to evaluate dental prophylaxis (DP) influence in tooth color L*a*b* values assessed by a spectrophotometer.

METHODS

For this diagnostic study a sample size was calculated based on preliminary results⁽⁶⁾. Seventy volunteers were consecutively screened according to the following inclusion criteria: to be at least 18 years of age and at least one of the selected teeth presenting a minimum A3 shade guide in VITA Classical (assessed by the spectrophotometer). Exclusion criteria were the presence of fixed orthodontic appliances, pregnancy, previous professional dental prophylaxis performed in a period shorter than six months before the first appointment, upper central incisors and upper canines with dental restorations, endodontic treatment or decay in anterior teeth and severe anomalies of the dental structure. Tooth color assessment was performed by a spectrophotometer, Spectroshade (SS) (MHT Optic Research, Niederhasli, Switzerland; serial number HDL3973) in both upper incisives (11, 21) and canines (13, 23) of each patient. For each measurement, CIE L*a*b* color coordinates were registered which allowed further calculation of color differences represented by ΔE units. Previous to DP procedure, two measurements were performed to evaluate SS reliability and baseline ΔE (intrinsic device color difference). One-week after DP, measurements with SS were done in order to determine changes in tooth color. Results are presented as mean ± standard deviation (SD) of CIE L*a*b* values and ΔE of global and individual teeth. SS reliability was assessed by intraclass correlation coefficient (ICC) according to the Fleiss classification⁽⁷⁾. ICC values ranged between 0.76 to 0.98 which are classified as excellent reliability. Differences between baseline and after DP measurements were analysed with Student paired t test with significance level set at α= 0.05. The perceptibility and acceptability thresholds values were considered as ΔE=1.2 and ΔE=2.7⁽⁸⁾, respectively.



Figure 1 – Study design

RESULTS

Tooth	CIE L*a*b* values 1 st measurement before DP			CIE L*a*b* values 2 nd measurement before DP			ΔE
	L*	a*	b*	L*	a*	b*	
11	75.70±2.15	2.33±0.90	17.52±2.72	75.77±2.17	2.30±0.83	17.52±2.72	0.95±0.50
13	70.07±2.13	5.17±1.04	23.95±2.28	70.24±2.64	5.18±1.11	23.79±2.53	1.30±1.04
21	75.85±2.29	2.31±0.79	17.26±2.46	75.86±2.03	2.31±0.77	17.16±2.46	0.93±0.58
23	70.30±1.90	5.44±1.03	23.82±2.07	70.72±2.02	5.49±0.96	23.76±2.15	1.14±1.10
Global	72.98±3.51	3.81±1.77	20.64±4.03	73.15±3.41	3.82±1.18	20.52±4.08	1.08±0.86

Table 1 – Descriptive analysis before DP

Presenting mean and SD CIE L*a*b* values in the 1st and 2nd measurements, before DP, with respective ΔE mean and SD for tooth 11, 13, 21 and 23. Global tooth values are also presented.

Tooth	CIE L*a*b* values after DP			ΔE
	L*	a*	b*	
11	75.67±2.11	2.30±0.80	17.22±2.63	1.51±1.05
13	69.89±2.35	5.11±1.03	23.60±2.55	1.93±1.71
21	75.94±2.04	2.29±0.78	17.12±2.47	1.59±1.42
23	70.29±2.06	5.48±0.83	23.76±2.05	1.70±1.59
Global	72.95±3.57	3.79±1.74	20.43±4.05	1.68±1.46

Table 2 – Descriptive analysis after DP

Presenting mean and SD CIE L*a*b* values, after DP, with respective ΔE mean and SD for tooth 11, 13, 21 and 23. Global tooth values are also presented.

% cases before DP		% cases after DP		ΔE mean difference after DP and P value
ΔE>PT	ΔE>AT	ΔE>PT	ΔE>AT	
29.55	3.41	53.03	13.26	0.60±1.55 P<0.01

Table 3 – DP effect on ΔE

Presenting the global tooth percentage of cases with ΔE above the PT and AT and the ΔE mean difference before and after DP with respective paired test P value.

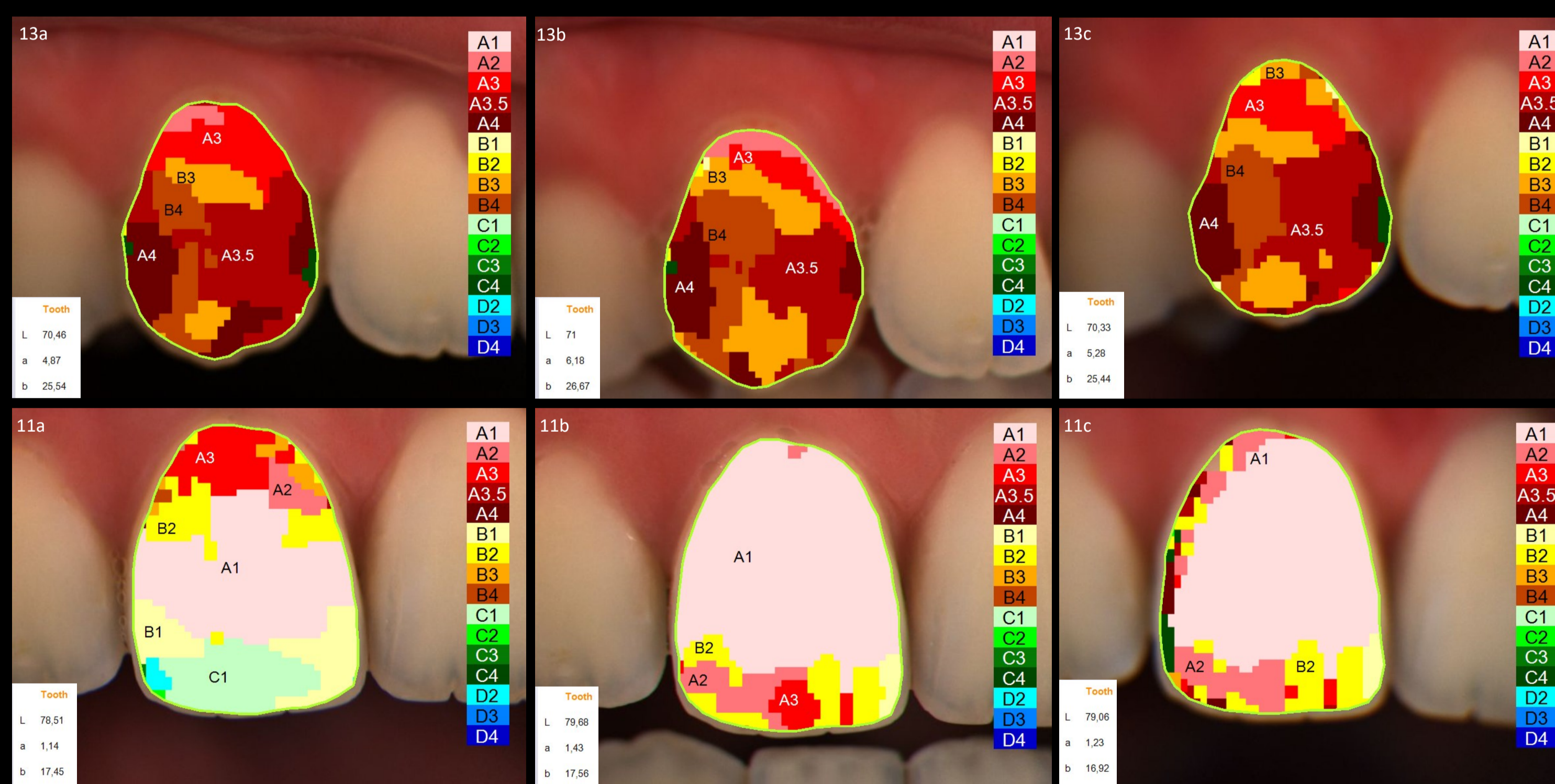


Figure 2 – Spectroshade analysis of tooth 11 and 13 in the 1st (a) and 2nd (b) measurements before DP and after DP (c), with respective L*a*b* values.

DISCUSSION

- Differences detected in CIE L*a*b* values after DP show that teeth are less yellow, represented by a decrease of b* coordinate. However these differences aren't significant when compared to the baseline values.
- There is a significative DP effect of 0.60 units in ΔE detected by SS. However this difference is still bellow the perceptibility threshold.

CONCLUSIONS

After performing dental prophylaxis, tooth color values presented a statistically significant difference in ΔE units detected by a spectrophotometer.

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