

# IN VITRO EVALUATION OF THE EFFICACY OF DENTAL THE BLEACHING

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## INTRODUCTION

Tooth discolouration causes can be categorized into two main groups: intrinsic and extrinsic staining. However, the accumulation of chromogens in the tooth is main mechanism responsible for the alteration of teeth colour. (1, 2)

There are basically three bleaching techniques for vital teeth: home-bleaching, in-office bleaching and combination of both. (1 – 6)

Minoux e Serfaty claim that the tooth bleaching is a complex technique and that its results depends on various factors, such as: the pH of the bleaching agent, the bleaching technique, the quantity of bleaching agent apply, tooth size and patient cooperation. (1, 6 – 7)

Actually, the carbamide peroxide (CP), hydrogen peroxide (HP) and sodium perborate (SP) are bleaching agents generally to used. (5, 8, 9 – 11)

This agents are classified by European Union as cosmetics products and not medical devices. So, the maximum concentrations available for use were decreased.

According to European directive 2011/84/EU and Portuguese decree-law no. 245/2015, the maximum concentration applied in-office are 6 and 18%, respectively, to hydrogen peroxide and carbamide peroxide. Therefore higher concentration were prohibited. Furthermore, the use the sodium perborate was prohibited

It is of the utmost relevance evaluate the bleaching efficiency of permitted concentrations of oxidizing agents by comparing the results of two bleaching protocols.

## MATERIALS AND METHODS

Fifty four bovine teeth were selected for this study using as exclusion criteria teeth that exhibition fractures or carious lesions. The teeth were divided, randomly, into two study groups (N=27, each group). In group 1 dental bleaching was performed with Polanight - 16% Carbamide Peroxide (SDI, Australia). In group 2 we combined Pola Office+ - Hydrogen Peroxide 6% (SDI, Australia) associated with Polanight.(Figure 1)

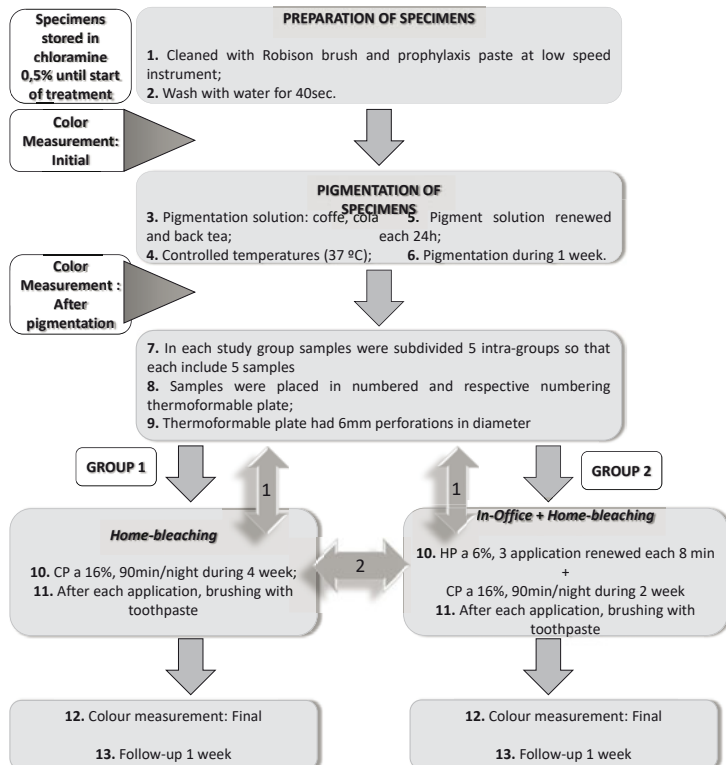


Figure 1: In vitro procedure

The evaluate of the colour sample realized with spectrophotometer Vita EasyShade® Compact. This colour evaluation according to the CIE-lab system (Commission Internationale L'Eclairage) registering the spatial coordinates L\*, a\* and b\*.

The results were analyzed to SPSS version 23. Realized descriptive analysis followed by an analysis of the hair test variables Shapiro-Wilk. In the depicted situation 1 using the paired t-test and situation 2 using the independent samples t-test.

Confidence level for all analyses was 95% ( $\alpha=0,05$ ).

## CONCLUSION

No statistically significant differences between the two groups were found. So, we conclude that both bleaching technique will provide a similar efficacy. Based on our results and published evidence it is the dentist responsibility to access the characteristics of the patient and goals of the treatment and choose the most appropriate technique.

## REFERENCES

## RESULTS/DISCUSSION

Tabela 1: Comparison of L\*, a\*, b\*,  $\Delta L^*$ ,  $\Delta a^*$  e  $\Delta b^*$  between the end of treatment and after dark

	Group 1 (CP 16%)			Group 2 (HP 6% + CP 16%)		
	$\bar{x}$	$\sigma$	p	$\bar{x}$	$\sigma$	p
L* after pigment	70,70	9,73	0,027	64,57	11,84	0,050
L* final	93,39	6,43		92,49	6,16	
$\Delta L^*$ final-after pigment	22,69	9,09	0,0005	27,92	11,07	0,0005
a* after pigment	8,14	4,66	0,017	9,53	4,97	0,056
a* final	-0,27	1,86		-0,26	1,54	
$\Delta a^*$ final-after pigment	-8,41	4,15	0,0005	-9,79	4,63	0,0005
b* after pigment	41,62	13,91	0,395	38,83	11,46	0,278
b* final	37,61	53,12		26,73	5,51	
$\Delta b^*$ final-after pigment	-18,24	14,19	0,0005	-12,09	11,59	0,0005
$\Delta E$ final-after pigment	33,22	10,42	0,0005	34,07	11,56	0,0005



Figure 2: After dar photos (I-group 1; II-group 2)

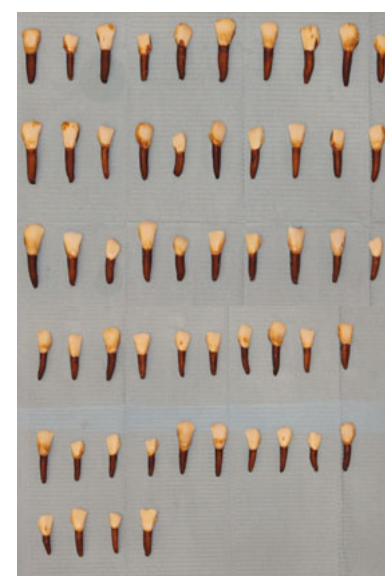


Figure 3: Final photos (I-group 1; II-group 2)

Both bleaching technique presented a coordinate L\* change in a positive direction. However, this difference was statistically significant in group 1 ( $p=0,027$ ) but not in group 2 by default ( $p=0,050$ ).

Relatively to  $\Delta L^*$  - end-after pigmentation – we found statistically significant differences in group 1 ( $p=0,0005$ ) and group 2 ( $p=0,0005$ ) but the mean was higher in group 2 (27,92; 11,07).

The coordinate b\* presented a negative change with bleaching technique but these differences were not statistically significant in both groups. When evaluate the  $\Delta b^*$  – end compared with after pigmentation – we found statistically significant differences in both groups ( $p=0,0005$ ).

According to the American Dental Association, the successful dental bleaching must increase the L\* coordinate and decreasing the b\*coordinate. The L\* coordinate represents the value (lightness or darkness) and is a measure of yellowness (axis Y positive) or blueness (axis Y negative). Such assumptions were verified in this study.

When compare the final results in both groups, verified that does not exists statistically significant differences.

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