WHITENESS THRESHOLDS IN DENTISTRY BASED ON WID INDEX: PRELIMINARY RESULTS .

María M. Pérez[1], Diana Dudea[2], Luis Javier Herrera[3] , Francisco Carrillo[1,3], Cristina Gasparik[2], Razvan Ghinea[1]*

[1]*Department of Optics., University of Granada, Campus Fuentenueva s/n, 18071, Granada, Spain*

[2]*Department of Prosthodontics and Dental Materials, Iluliu Hatieganu University of Medicine and Pharmacy 32, Clinicilor Sreet, 400001, Cluj-Napoca, Romania*

[3]*Department of Computer Architecture and Computer Technology. ETSIIT, University of Granada, s/n, 18071, Granada, Spain*

*Corresponding author's contact information.: Razvan Ghinea, Office 126, Department of Optics, Faculty of Sciences, University of Granada, Campus Fuentenueva, s/n 18071, Granada, Spain.
e-mail: rghinea@ugr.es.

Objectives: The main objective of this study was to determine the perceptibility and acceptability whiteness thresholds in dentistry using the new customized CIELAB –based whiteness index (WID) and a TSK Fuzzy Aproximation.

Methods: *A 20-observer panel (10-dentists and 10-no-dentist) performed independent observations of whiteness perceptibility and acceptability using 60 computer generated pairs of teeth with simulated gingiva displayed on a calibrated color monitor. Whiteness differences among the tooth pairs, calculated using the WID index (WID= 0.511L*- 2.324a*-1.100b*), ranged from 0.22 to 6,02. TSK Fuzzy Approximation was used as fitting procedure. For threshold determination, from the resultant fitting curves, the 95% confidence intervals were estimated and the 50:50% thresholds were calculated (50% positive and 50% negative answers)*

Results: *In Table are presented the values of both whiteness perceptibility and acceptability thresholds, as calculated with the WID index. Acceptability threshold was higher than Perceptibility threshold for both groups of observers. Also, lower values for both thresholds were found for the panel that included dental specialists.*

ΔWID values		
Acceptability	***TSK Fuzzy Aproximation***	***r^2 values***
Dentist	*2.15*	*0.57*
No-dentist	*2.90*	*0.45*
Perceptibility	***TSK Fuzzy Aproximation***	***r^2 values***
Dentist	*0.44*	*0.47*
No-dentist	*0.61*	*0.46*

Conclusions: *The CIELAB –based whiteness index (WID) and the TSK Fuzzy Aproximation have been proved to be a good approach for bleaching threshold calculation procedure in dentistry. The perceptibility and acceptability whiteness thresholds can be used to assess in office bleaching treatments, as well as to quantify effectiveness of different types of bleaching procedures*

.

Acknowledgments

The authors acknowledge funding support from research projects JA TEP-1136 from Junta de Andalucía and MAT2013-4396R from the Spanish Ministry of Economy and Competitiveness.