

Fluorescence in Resin-based Composite Restorations - Methodologies Analysis Narrative Review



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Introduction

Fluorescence is an important optical property in restoring aesthetic aspects, once it can change on behalf of different light sources effects.

Objectives

This narrative review aim to define the fluorescence concept, describing fluorescence analyzes methods and compare dental fluorescence with resin based composite (RBC).

Methods

Research conducted in PubMed/Science Direct of publications from 1996 to 2015 years with the keywords: "Resin-based Composites", "Multishaded Dental Composite", "aesthetic shade restoration", "Optical properties", "Tooth fluorescence", "Spectrophotometer". Seventy-two articles were identified. Methodology included review, clinical case and in vitro trials publications, it was selected 38 publications.

RESULTS

The FLUORESCENCE by definition is the absorption of light by a subject and the spontaneous emission of light in a longer wavelength. (Vanini, 1996; Busato *et al.*, 2006; Sensi *et al.*,

2006; Takahashi *et al.*, 2008; Yu & Lee, 2008; Silva *et al.*, 2014).

2008; Takahashi *et al.*, 2008; Yu & Lee, 2008; Silva *et al.*, 2014)

The most common procedures to evaluate the RBC fluorescence are: a spectrophotometer that performs the evaluation of the emitted intensity of fluorescence in nanometers of the tooth and RBC to be used; another procedure is based on a visual method with the use of *Wood's* light. This procedure presents advantages in economic terms. According to several authors, there are differences in RBC fluorescence, and those with natural teeth.

FLUORESCENCE EVALUATION

VISUAL METHOD

WOOD'S LIGHT



Fig. 1 - Visual examination, 11 tooth with distal restoration (adapted from de Kina and Bruguera, 2008).



Fig. 2 -The RBC fluorescence value is less than tooth (*Wood's* light) (adapted from Kina and Bruguera, 2008).

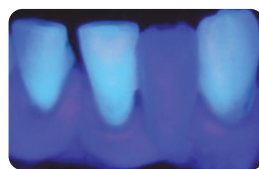


Fig. 3 - Fluorescence values visual values Admira™ (Voco®)

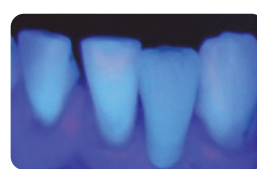


Fig. 4 - Fluorescence visual values Esthet X™ (Dentsply®) (adaptado de Busato *et al.*, 2006).

SPECTROPHOTOMETRY



Fig. 6 - Spectrophotometer analysis

The reflectance spectrophotometry is based on the dispersion of the components of the white light so as to be able to isolate a band of color through a slide and slot.

SPECTROPHOTOMETER

EVALUATION OF COLOUR PARAMETERS

According the Silva, T., *et al.* (2014) study, the direct method of measuring fluorescence using a spectrophotometer is efficient, in addition to being a promising tool for selecting composite resins by fluorescence

Resin-based composite	Classification	Fluorescence
Herculite XRV™	Microhibrid	Exaggerated
Tetric Ceram™	Microhibrid	Exaggerated
4 Seasons™	Microhibrid	Ideal
Amelogen™	Microhibrid	Ideal
Vit-I-scence™	Microhibrid	Ideal
Charisma™	Microhibrid	Absent
Filtek Z250™	Microhibrid	Absent

Table 1 - Fluorescence comparison of different trademarks by visual analysis with *Wood's* light (adapted from Sensi *et al.*, 2006).



Fig. 5 - Visual comparison of RBC fluorescence values through the *Wood's* light (adapted from Busato *et al.*, 2006)

This technique requires protection as the emitted wavelength

✓ THERE IS A GREAT IN RBC FLUORESCENCE VALUES

✓ THE RBC LAST LAYER IS RESPONSIBLE FOR THE FLUORESCENCE OF RESTORATION

Resin-based composite	Dentin layer	Enamel layer
Opallis™	266,07	257,97
4 Seasons™	443,27	473,52
Esthet-X™	296,91	475,92
Vit-I-scence™	1025,88	373,89
Charisma™	301,17	299,60
Filtek Supreme XT™	116,45	130,38
CONTROL	DENTIN 314,76 (54,82)*	ENAMEL 54,67 (14,19)*

Tabela 2 - Comparing the values obtained by spectrophotometry (* standard deviation) (adapted from Takahashi *et al.*, 2008).

RESIN-BASED COMPOSITE FLUORESCENCE DEPENDS:

RBC composition
Restoration thickness

Conclusions

The use of fluorescence assessment methods such as spectrophotometry and *Wood's* light, are auxiliary means for RBC selection, to be used in order to optimize the aesthetic restorative results.

Clinical implications

The selection of the restorative material should match the fluorescence characteristics of the tooth structure to restore, in order to obtain favorable aesthetic output.

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Key-words
 Resin-based Composites
 Multishaded Dental Composite
 Aesthetic shade restoration
 Optical properties
 Tooth fluorescence
 Spectrophotometer

