

The Fluorogram as a Tool for the Successful Adaptation of Rigid Gas Permeable Contact Lens

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Abstract

When contact lenses Rigid gas permeable become the best option for correcting a defective vision, good corrected visual acuity becomes a dependent factor of an ideal adaptation. To accomplish this, the specialist should be set not only in the refractive condition of the patient, but must achieve a proportional relationship between the conditions of its outer segment and a philosophy of adaptation, testing as fluorogram constitute a basic tool for assessing relationship between the lens-corneal tear-oriented complex and professional in making decisions for adjustments in this philosophy of adaptation. The objective of this systematic review was to highlight the usefulness that the authors give the fluorogram at the time of the adjustments to the RGP for each patient.

Keywords: *Fluorescein Pattern; Contact Lenses; Rigid Gas Permeable*

Introduction

The correction of refractive defects through the use of contact lenses has been available for several years, if rigid gas permeable contact lenses [RGPCL] are required, which are widely used for the correction of ametropia whose origin is the corneal curvature, these can offer a better therapeutic option allowing the patient to recover their visual acuity [1].

RGP contact lenses have evolved in their materials, manufacturing methods and designs, until reaching the quality in the final lens finish, in order to obtain the best results and achieve the highest precision in the parameters of the final lens. After studying the best option that can be adapted to the patient, it is necessary to perform a battery of tests, one of these tests is the fluorogram, which has high relevance when determining the details of the adaptation, since this test offers the examiner the possibility of observing the relationship that the contact lens has on the cornea, through fluorescein which is a contrast medium that is instilled on the ocular surface and illuminated with ultraviolet light. In this article we will review the importance of this test, when evaluating the adaptation of a RPG contact lens to give the best disposition to each patient.

Methodology

The type of study is a systematic review, corresponds to the area of research called evaluation of diagnostic tests, the sample consists of documents published between 1994 and 2010, which are found in the databases through the key words: pattern of fluorescein, fluorescein, contact lenses, contactology and permeable rigid gas.

Fluorogram

The installation of fluorescein is the best method to determine the relationship between a rigid contact lens and the cornea [1,2]. Straub was the first to use fluorescein to study corneal lesions in 1888 and was used with white light until 1938, when Obrig discovered that a cobalt blue filter significantly improved the observation of fluorescein patterns or fluorescein patterns [1,3].

The thickness of the tear film is what determines the intensity of the fluorescein pattern, it is for this property that it is important for contactologists to perform fluorograms in the RGP lens adaptations [4]. The tear film needs to have at least one thickness of 60 microns to provide fluorescence, with a fluorescein concentration of 0.025%, concentration that is normally used when this test is performed, the fluorescein pH and the installation time under evaluation allows the fluorescein to dissolve more in the tear and the fluorogram varied [5,6]. The fluorescein patterns provide a three-dimensional image of the tear film and allows a frontal observation of the lens-cornea relationship, in the areas where there is clarity that indicates that there is fluorescein under the lens and where dark areas are found indicates that there is contact between the lens and the cornea. Not always that dark areas are observed means that there is contact and also the tear film may not have a significant thickness [7].

There are different fluorescein patterns that can be found in an RGP lens fitting, but the formation of these is subject to the parameters of the lens, such as the sphericity, asphericity, toricity of the posterior face, the diameter of the lens, the base curve and the radius of corneal curvature and the topographic patterns of the anterior aspect of the cornea.

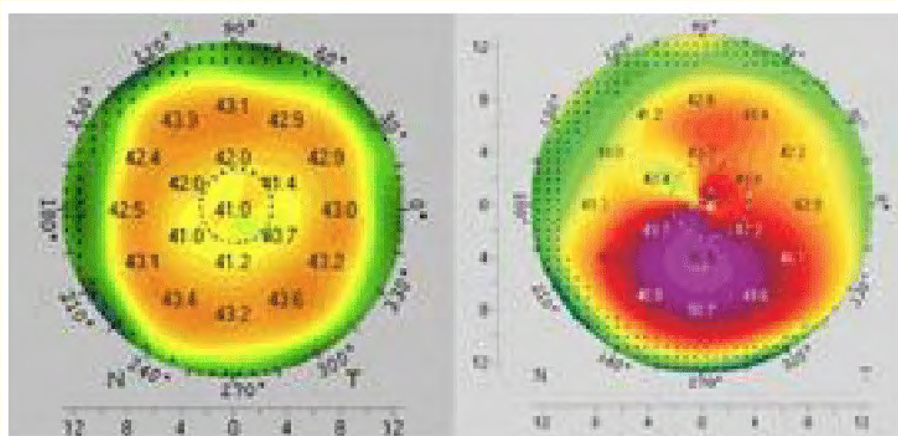


Figure 1: Topographic maps.

http://gsdl.bvs.sld.cu/greenstone/collect/oftalmol/index/assoc/HASH0140.dir/fig03_a07.png.

The spherical fluorograms that can be observed are parallelism, flattening and adjustment and the astigmatic fluorograms are bowtie, oval and double touch. Other types of fluorogram patterns different from those mentioned above can be observed in cases such as: post-surgical corneas of refractive surgery, corneal ectasias or scarring due to trauma.

In the evaluations of the adaptations of the RGP lenses, the visual acuity and comfort of the patient must be taken into account and when the slit lamp is observed the lens must be evaluated, whether the lens is centered or not, the movement to know if it is excessive, reduced or adequate. The expected fluorogram can be kept in mind before observing it in the slit lamp based on the base curve of the contact lens and the patient's keratometry.

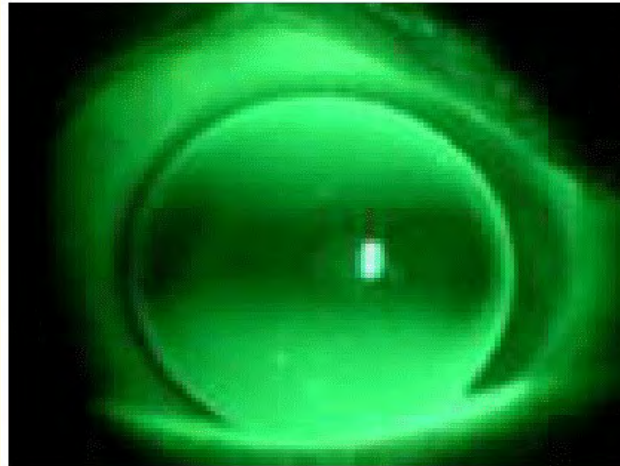


Figure 2: Fluorogram on bowtie.

http://www.conoptica.es/img/bias_rt3.jpg

Observed the fluorogram will know the cornea-lens relationship and the tear exchange that this relationship allows and whether or not it is adequate. The inadequate cornea-lens relationship is observed by the presence of reduced or excessive movement and decentration in the adaptation, either because the lens is very tight, very flattened or the diameter of the lens is not indicated, which can lead to complications of the adaptation of the RGP. These complications range from ocular redness, lacrimation, corneal and conjunctival staining, limitation of the removal of debris from the tear film under the lens, reduced or variable visual acuity, veil of depressions and staining in 3 and 9 among others [8].

Discussion

When carrying out the bibliography review about the fluorogram in the adaptation of the RGP lenses, a limited specific bibliographic material on the subject was evidenced, since it is a test and/or test where the examiner obtains unique and subjective data, therefore not quantifiable, which limits in part the search for the importance and/or relevance of the performance of the fluorogram as a gold standard test to define the final lens in the adaptation of RGP lenses.

Although the authors do not emphasize the importance of the fluorogram, there is a broad concept in the referenced bibliography, on the uses of fluorescein as a contrast medium, the fluorescence patterns and the various techniques or methods to evaluate such patterns of fluorograms, highlighting the importance of the lens-cornea relationship as a reference point in the fluorescence pattern.

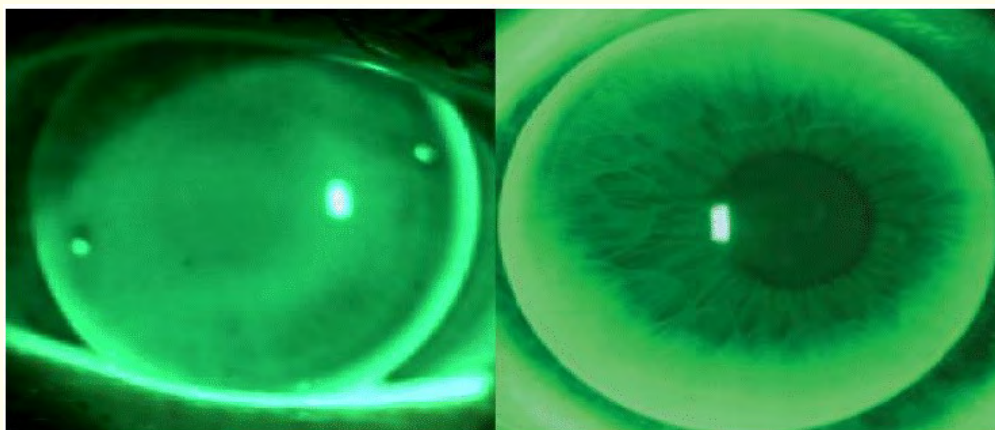


Figure 3: Adequate fluorogram / inadequate fluorogram.

http://www.conoptica.es/img/bias_s1_gran.jpg

Clinical experience has shown that an inadequate cornea-lens relationship or an irregular fluorogram may be the first indicator of adverse events of the RGP lenses in the patient, versus poor adaptation and reports of incomfort with lenses and related minimal eye discomfort with poor adaptation of the lens, since in addition to not recovering visual acuity, they put at risk the ocular surface to the permanent use of poorly adapted RGP lenses, as it could be the case of a fluorogram with a high adjustment, that by the incorrect analysis of the fluorescein pattern, could lead the patient to present a complication such as syndrome 3 and 9, by excessive support in the nasal and temporal part of the cornea.

Conclusion

Through the fluorogram you get enough information about the movement and position of the RGP lens on the cornea. By knowing the behavior of the contact lens on the cornea, the optimal lens-cornea relationship can be established, and thus provide an adequate adaptation of the RGP LC and the best optical correction, since these will offer the best possible visual acuity, the highest comfort and minimal or no alteration of the physiological characteristics of the cornea.

When an erroneous evaluation of a fluorogram is made or an inadequate fluorogram is presented and a bad interaction of the contact lens and the cornea is left, adverse events, consequences or complications for the patient can be generated such as: Syndrome 3 and 9, Warpage Corneal, Dimple Veiling or veil of depressions and corneal staining (Figure 4) among others.

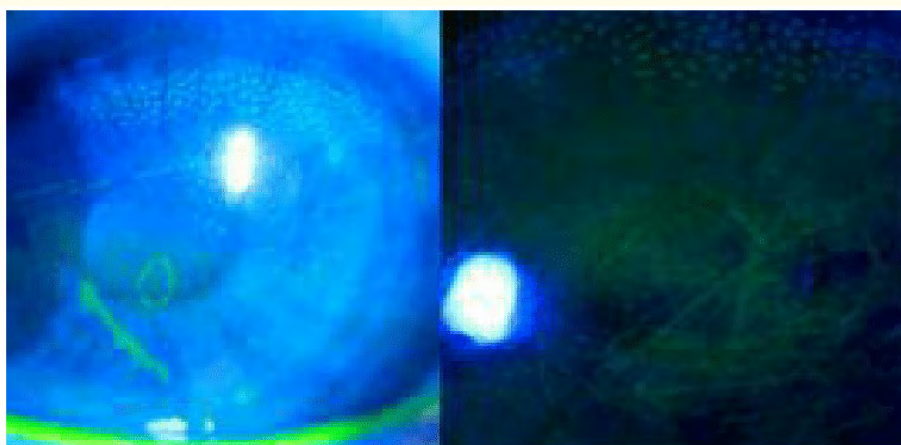


Figure 4: Complications of the use of RGP contact lenses.

That is why it is important to perform a correct evaluation and analysis of the fluorogram, in order to make the best decisions with each patient and provide a successful adaptation to RGP lenses.

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