



## Managing Corneal Epithelial Defects Using High Molecular Weight Fluorescein to Prevent Contact Lens Staining and Removal of Bandage Contact Lenses

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### Abstract

**Method:** A small group of patients with epithelial defects requiring bandage contact lenses were identified at Colchester Hospital University Hospital. Both Purevision lenses and Biofinity contact lenses were utilized. The lead researcher took anterior segment photography initially devoid of fluorescein. After Fluorosoft was introduced, the process was repeated where anterior section photograph was acquired after 30 seconds to guarantee Fluorosoft was fitted under the lens. Subsequently, removal of the bandage contact lens followed. Later, pictures of the bandage contact lens were taken to evaluate the staining. A second photography was obtained on the anterior segment photograph in order to compare the epithelial defect visibility with normal fluorescein relative to Fluorosoft.

### Conclusion:

- Main aim for this exercise is find a way of not replacing BCL on each examination without compromising the assessment of corneal epithelial defects hence reducing the chance of infection.
- The research demonstrates that the fluorosoft (high molecular weight fluorescein) can successfully detect epithelial deficiencies in patients having a series of bandage contact lenses devoid of lens' staining.

**Keywords:** Corneal Epithelial Defects; Fluorescein; Contact Lens Staining; Bandage Contact Lenses

### Introduction

The cornea occupies about two-thirds of the refractive ability of the eye. It is an arrangement consisting mainly water and collagen that is safeguarded and maintained on its posterior and anterior surfaces by endothelium and epithelium, respectively. Corneal epithelial defects are the damage of the outermost layer of cornea [1]. Corneal epithelial defects are the most prevalent problems recorded in optical pathologies and in the entire population. Corneal epithelial defects were responsible for more than 10 per cent of all eye-associated visits in the emergency rooms in the past few decades [2]. Research indicates that the problem is often overlooked but it may lead to loss of vision. Significantly, the symptoms of these defects include sensation of foreign body, tearing and pain

in the affected eye that are often alleviated by the implantation of relevant anaesthetic. However, the only exclusion is neurotropic keratopathy [3]. Such symptoms can be appearing along with pain during movement of the eye or blinking and photophobia. The corneal epithelial defects require physical examination in order to determine the level of the damage. In this respect, a comprehensive history is needed to assess the causes of the corneal defect. In addition, an in-depth test of both eyes is required in most instances of trauma and systemic diseases both eyes can be defective.

In literature, number of techniques and approaches to the treatment of epithelial problems have been described. Usually treatment starts with mild intervention including pressure patch-

ing, topical lubricants, ointment, and temporary soft plug punctual occlusion [7-9].

The loss can be due to a wide range of issues including neurotropic cornea, corneal dryness, mechanical trauma, or post-surgical modifications. Neurotropic keratopathy takes place after trigeminal nerve damage by either corneal anaesthesia or hypoesthesia. It can also be due to topical drop toxicity, VZV, and HSV [3]. In addition, inability to regenerate cells of the epithelial can occur due to a number of causes such as autoimmune degenerations of the eye, post-surgery effects in the years or chemical burns [3].

Ultraviolet burns can lead to corneal epithelial damage especially during extended sun exposure or welding. More importantly, procedure like corneal cross-linking, photorefractive keratectomy (PRK), and laser-assisted sub-epithelial keratomileusis (LASEK) can cause epithelial defects [4]. Fitting with a bandage contact lens can help to minimize pain and enhance epithelial healing. Application of soft lenses is an efficient way of managing the corneal epithelial defects because they assist in epithelialization of the eye. Subsequently, it safeguards the growing epithelial cells from eliminated by the repeated blinking of the eyelids. It also offers aesthetic relief [2]. Such patients require therapy to complement the contact lens bandage to ensure that the sticking of the lens to the ocular surface does not occur. Furthermore, close follow-up is needed to eliminate the chances of infection. However, evaluation of epithelial defects is challenging without fluorescein. Precisely, new lenses and contact lenses are needed for every evaluation [3]. Improvements in BCL material and technology have enabled the use of high-water-content BCLs for extended wear [10,11]. Traditionally high molecular Fluorescein sodium ophthalmic strip for evaluating contact lens fitting, for assessment of Tear film break up time and ocular surface staining.

Importantly, fixing new lenses may interrupt healing and disturb epithelium. Furthermore, fluorosoft or high molecular weight fluorescein fails to stain contact lenses. Similarly, it is often utilized for contact lenses fitting [4]. Among the survey done at UK in 2011, number of indications of CL were noted, notably Recurrent Erosions, Post-operative pain, Bullous Keratopathy and Ocular surface hydration.

In our study, corneal ulcer size was measured with high molecular weight fluorescein can be seen in table 1.

The purpose of the study is to determine if high molecular weight fluorescein can be utilized to make a diagnosis of epithelial defects, which can avert removal, and staining of bandage contact

Cases	Without lens	With lens	Reason of Epithelial defect
1	1 mm x 2 mm	1 mm x 2mm	Finger nail injury
2	3 mm x 2 mm	3 mm x 2 mm	Recurrent Erosion
3	0.5 mm x 2 mm	0.5 mm x 2 mm	Finger nail injury
4	1 mm x 1 mm	1 mm x 1 mm	Paper rubbed abrasion
5	3 mm x 0.5 mm	3 mm x 0.5 mm	Recurrent Erosion

Table

lens [3]. It was noted that, in eyes without wound healing problems, epithelialization is completed within a median period of 2 days. Primary reasons for their Epithelial defects were Traumatic abrasions and Recurrent erosion. Patient were followed on day 2 and day 7 to noticed the size of defects, as Bandage contact lenses are very essential since it assist in the management of corneal disorders especially epithelial defects. They are normally utilized in areas of a pressure patch to accomplish pain relief. Furthermore, they can help in the delivery of drug [3]. Research has indicated that they are often feasible and safer therapeutic application. The key reason why bandage contact lens should be used is to facilitate better supervision of corneal superficial interruption against other diseases such as dystrophic or trauma diseases. A bandage contact lens in comparison with traditional pressure patch permits concurrent utilization of medication, enables the doctor to monitor the progress of the eyes without the bandage removal. It permits the patient to acquire an operational vision with the capacity to wear sunglasses or spectacles when required [4]. The bandage contact lens is quite essential since they can deliver relief for pressure patching among patients suffering from Thygeson’s keratitis. Additionally, bandage contact lenses are ascertained to enhance the healing period of basic herpes simplex ulcers [1]. Bandage contact lens does provide protection usually provided by the lids; this protection is needed to allow migrating epithelial cells to develop proper adherence to the underlying basement membrane, promoting epithelialization [6]. Not uncommon, number of ophthalmologists has also been reported that the prolonged use of BCLs may be associated with a risk of infectious keratitis [5].

More importantly, they are very beneficial in post-surgical signals particularly after epithelial defects induced by laser epithelial keratomileusis and photorefractive keratectomy. In such cases, constant wearing of the bandage contact lens for 3 - 4 days following the surgery to permit re-epithelialization. They also offer pain relief pressure patching that enable usable vision of the patient and healing after surgery. They also control physically prompted papillary conjunctivitis [3].

## Results

The imaging was performed among five patients who satisfied inclusion criteria. Moreover, side-by-side comparison of the imaging was delivered. Based on the findings of the study, no difference in the field of epithelial staining with fluorescein as compared to fluorosoft (high molecular weight fluorescein) was observed. More importantly, high molecular weight fluorescein (fluorosoft) did not indicate any bandage contact lenses staining and we did not find any significant difference in epithelial defect sizes. We found safer option and can conclude that BCL does not need to replace on each examination, it minimizes the chance of infection by not replacing BCL.

## Conclusion

The research demonstrates that the fluorosoft (high molecular weight fluorescein) can successfully detect epithelial deficiencies in patients having a series of bandage contact lenses devoid of lens' staining. Furthermore, epithelial defects cared with bandage contact lenses and fluorosoft do not need repeated lens abstraction for analysis. The advantages of management of corneal epithelial defects include enhanced healing, fewer lenses needed for procedures, it provides less discomfort to persons with recurrent removal of lenses. Therefore, the high molecular weight fluorescein would be essential to ophthalmologist conducting photorefractive keratectomy (PRK), laser-assisted sub-epithelial keratomileusis (LASEK), and cross-linking of cornea [2].

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