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Abstract
Today, with the advent of new materials and technologies, rigid gas permeable(RGP) contact lenses are becoming a popular option for both practitioners and patients. Thus, the ability to assess the fitting characteristics of an RGP lens is a maxim for the successful contact lens fitter. Because patients and resources are limited at Pacific University due to sheer numbers, students often must rely on book knowledge and photographs to understand good and poor fits. Therefore, we have created a videotape of fluorescein patterns of various contact lens fits. The video examines changing base curve while all other parameters are held constant, changing the overall diameter of the lens, and spherical lenses on astigmatic corneas. This videotape demonstrates the dynamic characteristics of RGP lens movements that can not be seen in photographs.

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FITTING CHARACTERISTICS OF THE RIGID CONTACT LENS: A VIDEO GUIDE TO FLUORESCEIN PATTERNS

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ABSTRACT:

Today, with the advent of new materials and technologies, rigid gas permeable(RGP) contact lenses are becoming a popular option for both practitioners and patients. Thus, the ability to assess the fitting characteristics of an RGP lens is a maxim for the successful contact lens fitter. Because patients and resources are limited at Pacific University due to sheer numbers, students often must rely on book knowledge and photographs to understand good and poor fits. Therefore, we have created a videotape of fluorescein patterns of various contact lens fits. The video examines changing base curve while all other parameters are held constant, changing the overall diameter of the lens, and spherical lenses on astigmatic corneas. This videotape demonstrates the dynamic characteristics of RGP lens movements that can not be seen in photographs.

SCRIPT FOR "FLUORESCEIN PATTERN" VIDEO

(Note: Words in italics correspond with video scenes and those in outline and all capital letters represent color graphics.)

Direct View of the Cornea (Brown Iris)

Any discussion of contact lens fitting must begin with a consideration of the physiologically healthy cornea. In the healthy state, this transparent structure constitutes the first and principal optical component of the eye. Although known for it's regenerative capacity, it is also extremely sensitive to injury and metabolic insult. As such, corneal health must remain the clinicians primary concern whenever contact lens therapy is instituted.

Physiological considerations that are of importance in the design of contact lenses are: corneal sensitivity, transparency, regulation of water content and transfer of oxygen and carbon dioxide.

Biomicroscope/ Wratten #12

This last item is principally evaluated by direct in vivo examination of the corneal fit utilizing sodium fluorescein and a biomicroscope modified with a Kodak Wratten #12 filter. Consequently, great proficiency in the interpretation of fluorescein patterns is necessary to ensure a proper contact lens fit.

Rotating Contact Lens

This video has been produced to document the fitting characteristics of a rigid gas permeable lens and subsequent keys to the appropriate fluorescein interpretation.

Inserting C.L. onto patient

We will explore the effects of the manipulation of three primary parameters of rigid gas permeable lens designs: Base Curve, Overall Diameter & Blend. By changing only one parameter, its effect on the fitting characteristics of the lens as evidenced by the fluorescein pattern can be isolated and studied.

Instillation of Fluorescein

It must be emphasized that any change in contact lens design will invariably translate into a fitting change whether clinically observable or not. This "fitting" modification may manifest in varying degrees ranging from a subtle change in lens/cornea interface observable only by careful fluorescein evaluation with a biomicroscope to a complete shift in how the lens positions on the eye.

Human Eye (Brown Iris)

For this instructional video, we have selected a representative cornea exhibiting minimal corneal cylinder and consistent topography. Our study of fluorescein pattern interpretation will begin with a consideration of an RGP fit "on K".

BASE CURVE 7.99mm OAD 9.0
OZ 7.8
TRIAL FIT: "ON K"
KERATOMETRY: 42.25 X 180, 43.00 X 90

Principal corneal fit

This fit shows a well centered "on K" fit with minimal inferior pooling as a result of slight corneal toricity. Adequate lens movement and snap back following blink are clearly evident.

BASE CURVE 7.90mm   OAD 9.0
OZ 7.8
TRIAL FIT: 0.50 DIOPTERS STEEP

In the following examples the overall diameter, optic zone, peripheral curves, and blend have been held constant. The change being made only in the base curve of the trial lens. In this example, the base curve has been steepened one half diopter.

0.50 D STEEP LENS

This example reveals the central pooling of fluorescein associated with the steepened base curve. In addition a midperipheral bearing area which is demonstrated by a lack of fluorescence can be seen for nearly 360 degrees. The lens exhibits adequate movement with a tendency to drop.

BASE CURVE 7.80mm   OAD 9.0
OZ 7.8
TRIAL FIT: 1.00 DIOPTERS STEEP

1.00 D STEEP LENS

This lens is fit one diopter steep. Although central pooling is evident its characteristics and fluorescein pattern are similar to the previous lens.

BASE CURVE 7.71mm   OAD 9.0
OZ 7.8
TRIAL FIT: 1.50 DIOPTERS STEEP

1.50 D STEEP LENS

Finally, the same eye fit 1.50 diopters steeper than "K." Here, the central pooling is more pronounced with midperipheral bearing noted a full 360 degrees. The lens movement has become sluggish and shows interpalpebral positioning. Now lets consider the unique characteristics of a lens fit flatter than the flattest meridian of the eye.

BASE CURVE 8.08mm OAD 9.0
OZ 7.8
TRIAL FIT: 0.50 DIOPTERS FLAT

0.50 D FLAT LENS

In this example of a lens fit one half diopter flat the slight central touch can be appreciated with greater fluorescence inferiorly. Note that as the superior lid compresses the upper edge surface, the central contact point acts as a fulcrum and lifts the inferior portion of the lens as evidenced by the increased fluorescence. The lens movement remains adequate.

BASE CURVE 8.18mm OAD 9.0
OZ 7.8
TRIAL FIT: 1.00 DIOPTER FLAT

1.00 D FLAT LENS

This lens is fit a full diopter flatter than the flattest "K". The central touch and midperipheral stand off are now more evident.

Human Eye (Brown Iris)

Having carefully explored the effect of changes of base curve on the fitting characteristics of a rigid lens we now turn our attention to what effect, if any, the overall diameter has on lens dynamics while all other variables are held constant.

BASE CURVE 7.95mm OAD 9.7
OZ 8.5
TRIAL FIT: "ON K"

9.7mm OAD LENS

In this fit the OAD has been increased from the original 9.0 millimeters to 9.7. Though we would predict an "on K" fit, the lens fits somewhat flat. The lens can be seen moving under the upper lid on blink but then slowly drops.

BASE CURVE 7.95mm   OAD 7.50
OZ 6.50
TRIAL FIT: "ON K"

7.50mm OAD LENS

In this case the OAD has been reduced to 7.50 millimeters. When the patient blinks fully the lens centers with minimal pooling of fluorescein. But, the lens often freely slides around on the cornea indicating a need to steepen the base curve to add stability.

Human Eye (Blue Iris)

The proper interpretation of fluorescein patterns will also yield valuable information concerning corneal toricity. Consequently, rather characteristic patterns are created when a lens of known curvature is fit on corneas with high degrees of manifest cylinder. The clinician should be able to recognize these distinct patterns. Here are examples of two better known patterns.

WTR CONTACT LENS FIT

This is an example of a spherical base curve lens fit to the flattest corneal meridian of a cornea with greater than two diopters of with the rule astigmatism. Note the superior and inferior areas of fluorescein pooling and the horizontal strip of non fluorescence.

ATR CONTACT LENS FIT

This is an example of an against the rule cornea with two diopters of cylinder which is evidenced by the areas of fluorescence seen nasally and temporally. The downward and temporal movement of the lens after blink tends to diminish the nasal fluorescence. The unpredictable movement of a lens on an against the rule cornea makes the fitting of such a patient a challenge.

Closing

As can be seen from the previous examples, the accurate interpretation of fluorescein patterns is integral to the successful fitting of the rigid lens. For the careful observer, it remains the key objective finding to ensure a successful contact lens fit.

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