

Evidence Based Guideline

Phototherapeutic Keratectomy

File Name: phototherapeutic_keratectomy
Guideline Number: EBG.SUR6545
Origination: 1/2005
Last Review: 4/2009
Next Review: 4/2011

Description of Procedure or Service

Phototherapeutic keratectomy involves the use of the excimer laser to treat visual impairment or irritative symptoms relating to diseases of the anterior cornea by sequentially ablating (destroying) uniformly thin layers of corneal tissue. The excimer laser does not cut tissue like a scalpel; rather, the greatest advantage of the excimer laser is its ability to precisely remove or vaporize tissue with little or no effect on surrounding tissue. Phototherapeutic keratectomy may be performed in the office setting using topical anesthesia. *Phototherapeutic* keratectomy must be distinguished from *photorefractive* keratectomy, which involves the use of the excimer laser to correct refractive errors of the eye (i.e., myopia, astigmatism, hyperopia, and presbyopia). Photorefractive keratectomy is addressed in a separate policy, Refractive Keratoplasty, SUR6590.

Essentially, phototherapeutic keratectomy (PTK) functions by removing anterior stromal opacities or eliminating elevated corneal lesions while maintaining a smooth corneal surface. Complications of PTK include refractive errors, most commonly hyperopia, corneal scarring, and glare. The U.S. Food and Drug Administration (FDA) labeling for the excimer laser identifies the following ophthalmologic therapeutic indications:

- ◆ Superficial corneal dystrophies (including granular, lattice, and Reis-Buckler's dystrophies)
- ◆ Epithelial basement membrane dystrophy, irregular corneal surfaces (secondary to Salzmann's degeneration, keratoconus nodules, or other irregular surfaces)
- ◆ Corneal scars and opacities (i.e., post-traumatic, post-surgical, post-infectious, and secondary to pathology).

Although not included in the FDA labeling, there has been interest in PTK as a treatment of recurrent corneal erosions in patients who have not responded to conservative therapy with patching, cycloplegia, topical antibiotics, and lubricants.

When PTK is used to remove only the epithelial surface of the cornea, the alternative technology is mechanical superficial keratectomy, i.e., corneal scraping. When PTK is used to remove deeper layers of the cornea, i.e., extending into Bowman's layer, competing technologies include lamellar keratoplasty (i.e., non-penetrating keratoplasty - a corneal transplant procedure in which a partial thickness of the cornea is removed and the diseased tissue is replaced with a partial-thickness donor cornea.) In addition, candidates for PTK should have exhausted medical approaches. For example, recurrent corneal erosions can be treated conservatively with lubricants, patching, bandage contact lenses, or anterior stromal punctures, while keratoconus can be treated with rigid contact lenses to correct the astigmatism.

Evidence Based Guideline for Phototherapeutic Keratectomy

Phototherapeutic keratectomy may be appropriate when used as an alternative to a lamellar keratoplasty in

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the treatment of visual impairment or irritative symptoms related to [corneal](#) scars, [opacities](#), or dystrophies extending beyond the [epithelial](#) layer.

Medical Evidence regarding Phototherapeutic Keratectomy indicates it is not recommended in the following situations:

Phototherapeutic keratectomy is not recommended for the treatment of recurrent [corneal](#) erosions and infectious keratitis.

Phototherapeutic keratectomy is not recommended when used as an alternative to a superficial mechanical keratectomy in treating patients with superficial [corneal dystrophy](#), [epithelial](#) membrane dystrophy, and irregular [corneal](#) surfaces due to Salzmann's nodular degeneration or keratoconus nodules.

Phototherapeutic keratectomy (PTK) should not be confused with photorefractive keratectomy (PRK). Although technically the same procedure, PTK is used for the correction of particular [corneal diseases](#), whereas PRK involves use of the excimer laser for correction of [refractive errors](#) in persons with otherwise non-diseased [corneas](#). [Refractive errors](#) occur when the eye cannot properly focus light and images appear out of focus. The main types of [refractive errors](#) are [myopia](#) (nearsightedness), [hyperopia](#) (farsightedness) and [astigmatism](#) (distortion). [Presbyopia](#) (aging eye) is a problem of the lens and is characterized by the inability to bring close objects into focus.

Photorefractive keratectomy is addressed in a separate policy, Refractive Surgery, SUR6590.

Benefits Application

Please refer to certificate for availability of benefit. This guideline relates only to the services or supplies described herein. Benefits may vary according to benefit design; therefore certificate language should be reviewed before applying the terms of the policy.

Billing/Coding/Physician Documentation Information

This policy may apply to the following codes. Inclusion of a code in this section does not guarantee that it will be reimbursed. For further information on reimbursement guidelines, please see Administrative Policies on the Blue Cross Blue Shield of North Carolina web site at www.bcbsnc.com. They are listed in the Category Search on the Medical Policy search page.

Applicable codes: S0812

Medical Term Definitions

Astigmatism

uneven curvature of the cornea in which refractive light rays are bent out of focus resulting in distorted vision. Those people with astigmatism are usually born with the disorder and it does not worsen with age. Often occurs in conjunction with nearsightedness or farsightedness.

Bowman's layer

a transparent sheet of tissue composed of strong layered protein fibers called collagen. Once injured, Bowman's layer can form a scar as it heals. If these scars are large and centrally located, some vision loss can occur.

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Cornea

the transparent structure that forms the front part of the fibrous tunic of the eye. The normally clear front window of the eye that transmits and focuses light into the eye.

Corneal dystrophy

any of a number of rare hereditary abnormalities that are characterized by an accumulation of abnormal material in the cornea. This accumulation may occur later in life and result in cloudiness of the cornea and reduction in vision.

Epithelial

referring to the cornea's extremely fine surface layer, only one-twentieth of a mm thick, which is normally firmly attached to the rest of the cornea underneath it. The outer surface layer of the cornea, like the epidermis or outer layer of the skin.

Epithelial basement membrane dystrophy

a disease that disrupts the ability of the epithelium to attach to the lower layers of the cornea. The epithelium will often grow unevenly or will detach from the cornea.

Hyperopia

also called farsightedness. Vision that results when there is too short a distance from the cornea to the retina. This can be caused by an eye that has a vertical oval shape or a cornea that is flatter than normal. In either case, a person who is farsighted sees well at a distance but has poor reading vision. Those who are farsighted are usually born with the disorder.

Myopia

also called nearsightedness. The front curvature of the cornea is too steep in a nearsighted person, causing good reading vision but poor distance vision.

Opacities

a lack of transparency; opaque or nontransparent spots or areas. To see well, all layers of the cornea must be free of any cloudy or opaque areas.

Presbyopia

deterioration in the ability of the eye's natural crystalline lens to expand or contract in order to focus on close objects.

Refractive error

optical defect of the eye that causes light rays to focus in front of the retina (nearsighted), behind the retina (farsighted), or in several different places on the retina (astigmatic), resulting in less than perfect vision. These defects can normally be corrected with eyeglasses, contact lenses or refractive eye surgery.

Stroma

a layer accounting for 90% of the cornea's thickness, consisting primarily of water (78 percent) and collagen (16 percent), and does not contain any blood vessels. Collagen gives the cornea its strength, elasticity, and form. The collagen's unique shape, arrangement, and spacing are essential in producing the cornea's light-conducting transparency.

Scientific Background and Reference Sources

Policy: Phototherapeutic Keratectomy

Specialty Matched Consultant Advisory Panel - 1/2005

BCBSA Medical Policy Reference Manual [Electronic Version]. 9.03.07, 4/1/05.

Specialty Matched Consultant Advisory Panel - 1/25/07

Specialty Matched Consultant Advisory Panel - 4/6/09.

Policy Implementation/Update Information

- 1/20/2005 Specialty Matched Consultant Advisory Panel review - 1/5/2005. Notification of new policy titled "Phototherapeutic Keratectomy". PTK may be considered medically necessary when used as an alternative to a lamellar keratoplasty in the treatment of visual impairment or irritative symptoms related to corneal scars, opacities, or dystrophies extending beyond the epithelial layer. PTK is considered not medically necessary when used as an alternative to a superficial mechanical keratectomy in treating patients with superficial corneal dystrophy, epithelial membrane dystrophy, and irregular corneal surfaces due to Salzmann's nodular degeneration or keratoconus nodules. Investigational applications of PTK include treatment of recurrent corneal erosions and infectious keratitis. Notification given 1/20/05. Effective date 4/7/05.
- 2/26/07 Specialty Matched Consultant Advisory Panel review. No changes to criteria. Reference sources added. (pmo)
- 9/22/08 Medical Policy changed to Evidence Based Guideline. (pmo)
- 4/27/09 No changes to guidelines. Reference source added. (pmo)

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