

CORNEAL CROSS-LINKING

Comanagement Guidelines

WHAT IS CORNEAL CROSS-LINKING?

- Also known as CXL, it is a minimally-invasive treatment that strengthens stromal tissue
- CXL is used to stabilize the stroma in many degenerative corneal diseases including keratoconus and pellucid marginal degeneration

HOW DOES IT WORK?

- The cornea is strengthened by application of riboflavin (vitamin B2) followed by treatment with UVA light
- Numerous studies have shown that treatment can increase the rigidity of human corneas 300% or more
- Biomechanical rigidity and biochemical resistance of the cornea is increased through:
 1. Instantaneous formation of covalent bonds (crosslinks) and inhibition of collagenase
 2. Long-term stabilizing effect by synthesis of new collagen with different structure and resistance

PURPOSE

- To halt progressive corneal ectasia
- Prevent disease progression through corneal stabilization
 - Early disease - prevent necessity for rigid contact lens wear
 - Moderate disease with rigid lens wear - prevent corneal transplantation

PATIENT SELECTION

- In general, 15 years or older with the ability to cooperate during treatment
- Progressive corneal ectasia
- Increase in spherical and/or cylindrical component of refraction
- Decrease in best corrected visual acuity
- Topography showing alteration in corneal shape and disease progression
- Note that significant corneal scarring and/or the ability for RGPs to no longer provide reasonable vision are indications the patient is beyond the utility of CXL

EVALUATION FOR TREATMENT

- A referral form is available in the *For Doctors* section of our website
- We request findings that support progressive corneal ectasia
- This includes baseline and recent topography
- K reading and/or manifest refraction if topography is not available
- Recent BCVA with RGP lenses
- Before our pre-op evaluation, soft lenses must be left out at least 7 days and RGPs at least 2 weeks. This can be done one eye at a time

CONTRAINDICATIONS

- Pachymetry less than 400 microns, with some exceptions
- Prior herpetic corneal infection
- Current infection
- History of poor epithelial wound healing
- Severe ocular surface disease
- Autoimmune disorders
- Significant corneal scarring
- RGPs no longer provide reasonable vision

RECOVERY

- Similar to PRK
- Topical NSAID and prescriptive oral pain medication prescribed to improve comfort

DISCHARGE INSTRUCTIONS

- Prednisolone acetate 1% - qid x 1 week, bid x 2 weeks, qd x 2 weeks
- Moxifloxacin - q2h x 1 day, qid until re-epithelialized
- Acuvail - 1gt q5m for 15 minutes followed by q2h as needed for pain up to 24 hours following procedure
- Hydrocodone - 5/325mg - or - 7.5/325mg, dispense 14 tablets, q4-6h as needed for pain, no more than 5 tablets per day
- Frequent use of preservative free artificial tears
- Patients are educated to avoid exposure to sunlight for a minimum of 24 hours
- If riboflavin is still evident during the 1 day post-op slit lamp exam (yellow tinged corneal tissue), UV protection should be continued
- Patients are instructed to be out of their contact lenses for 2 weeks post-operatively

POST-OPERATIVE CARE

- Until post-operative expectations are established, these exams will be done at PCLI:
 - 1 day
 - VA, slit lamp evaluation
 - 3-5 days
 - VA, slit lamp evaluation, BCL removal
 - 1 month
 - VA, AR, IOP, slit lamp evaluation, topography
 - 3 months
 - VA, AR, IOP, slit lamp evaluation, topography
 - 12 months
 - VA, AR, MR, IOP, slit lamp evaluation, topography
 - Additional treatment may be considered if continued progression is evident on topography. Studies show previous CXL does not reduce effect of follow-up procedures.

HEALING

- Maximum keratometry and visual acuity is typically worsened at 1 month followed by improvement and stabilization after 6 months
- There is initial epithelium thinning, stromal edema and keratocyte apoptosis on confocal microscopy that explains the initial worsening at 4-6 weeks
- Improvement after 3 months is demonstrated by epithelial thickening, decreased edema and collagen compaction

INCREASED RISK OF COMPLICATIONS

- Patients >35 years old
- Pre-op CDVA better than 20/25
- Pre-op maximum K reading greater than 58 diopters
- Vogt striae associated with risk for permanent stromal haze

POTENTIAL COMPLICATIONS

- Delayed re-epithelialization
- Corneal haze
- Inflammation
- Infection
- Increased IOP from steroid response
- Endothelial issues
- Treatment failure